December 1966

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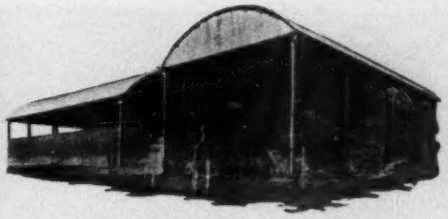

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CONTENTS

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'Ye commons left free in the rude rags of nature,
Ye brown heaths beclothed in furze as ye be,
My wild eye in rapture adores every feature,
Ye are dear as this heart in my bosom to me'.

JOHN CLARE'S words, written about 1830, are more likely to conjure visions of a summer scene. Yet this winter 'ye brown heaths' will be very much in the minds of many farmers, both big and small. In January, 1967, the county councils (and county borough councils) will be opening their registers for the receipt of applications under the Commons Registration Act of last year. Anyone who possesses rights of common which are registrable under this Act will need to apply to his county authority for the rights to be registered, otherwise the rights will be lost. The registration provisions of the Act do not apply to the New Forest, Epping Forest or the Forest of Dean, or to the few additional areas which will be exempted before the end of 1966. But elsewhere in England and Wales it is essential that any common rights are registered or else normally the rights will cease to exist.

The county authorities do not know who possesses common rights. They can register the rights only if application is made to them by the owner of the rights or, if the rights are comprised in a farm tenancy, by the landlord or by the tenant. This applies as much to a man running 500 ewes on a Cumberland fell common as to a smallholder with a right to turn out two cows on a village green. If they do not make application, they will normally lose their rights. Even where rights exist which have not been exercised for some years past, an application should be made, so as to preserve the rights for the future.

Intending applicants will be busy making preparations during these winter days. Where does the boundary of the common run? How many head of stock and of which kinds can be turned out? Questions like these may mean delving into old farm, or manorial, records. This, too, is a subject for the bar parlour. The more that commoners can talk it over among themselves before registration starts, the less chance there will be of their having to defend provisionally registered claims against objections under the arrangements for arbitration that will be made.

Application forms for the registration of common rights will very soon be available from county council offices. Intending applicants are recommended not to delay in asking for a form; and they should certainly not be without the official explanatory booklet *Common Land* obtainable free from any local authority or parish council clerk.

K. W. EVANS

Vitamin A Deficiency in Young Cattle

F. R. Spratling P. S. Bridge

It is surprising that in the sixties a well-known vitamin may apparently be forgotten in the feeding of young cattle. Yet, in recent years many cases of deficiency have been recorded. What is more unexpected is that the vitamin has not always been overlooked, but still trouble is being experienced. The purpose of this article is to draw attention to the importance of vitamin A, to explain why deficiency has been occurring, and to suggest ways in which this may be avoided.

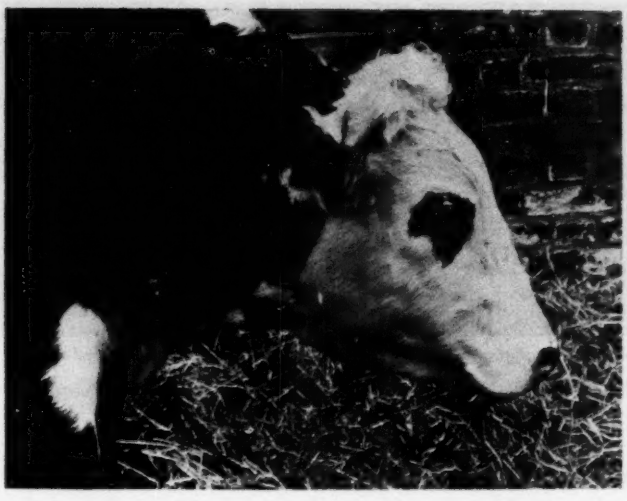
What is vitamin A?

Vitamin A, or retinol as it is now called, is an organic compound required by cattle of all ages for normal growth, reproduction and lactation. It is particularly concerned with visual processes and the maintenance of normal body tissues. With the exception of colostrum and milk it is not found in the natural diet of cattle, but fortunately a precursor of retinol known as β carotene is found in many foods consumed by cattle, e.g., grasses, legumes, high quality hay or silage, dried grass and kale. The carotene is converted to retinol in the wall of the small intestine and is then conveyed to the liver where it is stored for future use. It is thus evident that a daily supply of the vitamin in the food is not required, as reserves may be accumulated to last for several months. In cows, retinol is passed in small quantities to a developing foetus and in larger quantities into colostrum or milk.

For the supplementation of animal rations, retinol is available in fish liver oils and as synthetic retinol in powder form. The latter is often incorporated in 'beadlets' which comprise the vitamin mixed with anti-oxidants and dispersed in a base of sugar, starch and gelatin. So protected, retinol is stable under reasonable conditions of storage for several weeks.

How may deficiency occur?

Deficiency signs are found most commonly in young growing or fattening cattle. There is usually a history that affected cattle have never been out to grass and therefore have not had the same opportunity to accumulate large



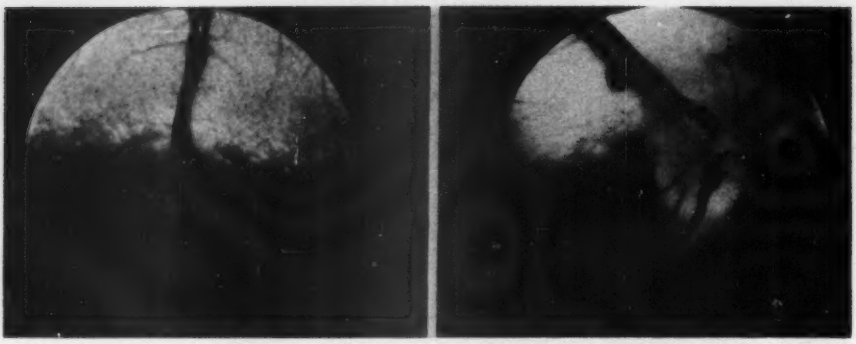
Blind Hereford-cross steer, showing hanging head, blank expression and prominent eyes

reserves of retinol. In East Anglia young stock may be fed during the winter only on feedingstuffs deficient in carotene, e.g., cereals, dried sugar beet pulp, vegetable protein foods, straw and poor quality hay. The 'barley-beef' system may be practised in any part of the country and so deficiency may be widespread. In this system cattle are fed on carotene-deficient feeds and are therefore dependent on a supplement of pre-formed retinol. On occasion this supplement has been omitted, either by ignorance or mistake, and so it is not surprising that deficiency has occurred. In some cases unprotected retinol has been added and has undergone deterioration so that insufficient remains. In other cases stabilized retinol has been used at recommended levels and still deficiency signs have been shown. It is now known that barley-beef animals require larger amounts of retinol to satisfy their increased rates of metabolism. Since both the nature of the ingesta and the rate of its passage to the small intestine are different from conventional diets, it is also possible that the absorption of retinol is less efficient.

Silage has also been found to be at fault in cases of vitamin A deficiency. There have been several reports from the U.S.A. in cattle supposedly fed adequate rations based on maize silage, particularly when the silage had a high content of inorganic nitrate. It has been suggested that nitrate may interfere with the conversion of carotene or with the absorption of retinol. Although there have been no reports of vitamin A deficiency associated with silage-feeding in Britain, the position might be different if cattle were to be deprived of summer grazing and fed silage all the year round.

What are the signs of deficiency?

Probably the earliest sign of vitamin A deficiency is reduction of appetite but this is unlikely to be noticed in yarded cattle. Another early sign is poor 'dark adaptation': a careful observer may notice animals blundering into objects in dim light. Later, one or more cases of blindness may be seen, affected animals showing bulging eyes with dilated pupils and a greenish glow. Such animals feel their way about and collide with objects. Other animals are likely to show coughing and other signs of respiratory disorder, diarrhoea, weeping eyes, 'fainting' attacks, and swelling of limbs or brisket.



(Left) Normal eyes as seen by ophthalmoscope. Note flat disc and well-defined blood vessels
(Right) Disc of calf with vitamin A deficiency. Note swollen disc and large haemorrhage

How is diagnosis confirmed?

Many of the signs described previously may be seen in illness from other causes. However, the finding of blind cattle associated with intensive husbandry or the feeding of carotene-deficient foods should arouse suspicion of vitamin A deficiency. Confirmation is obtained by veterinary examination of the depths of the eye using an ophthalmoscope and looking for swelling of the optic disc and haemorrhages. Blood samples may also be examined to determine the level of retinol. After death, liver levels of retinol and post-mortem findings provide additional evidence.

Treatment and prevention

With the exception of blindness, the signs of deficiency can be reversed by giving an injection of retinol followed by adequate supplementation of the food.

Deficient foods such as straw, cereals, sugar beet pulp and oil-seed cakes, should be supplemented by the provision of carotene or retinol. Carotene may be supplied in fresh green foods or dried grass and lucerne meals. Alternatively, synthetic retinol may be added. If the ration is of the high energy, low roughage kind super-supplementation with the pre-formed vitamin is indicated. Levels of 6–10 million i.u. per ton of food are usually recommended.

Carotene-containing foods and synthetic retinol should be stored carefully to avoid deterioration. Although synthetic retinol is usually protected by gelatin or wax and anti-oxidants, it is safer to prepare and mix small quantities of feed at a time. It is obviously most important to ensure that the supplement is added and at adequate level.

What of the future?

The arrival of intensive methods of milk production, where cows are kept in yards all the year round and fed either a complete, milled concentrate diet *ad libitum* or a diet based mainly on high dry matter silage, suggests that deficiency may occur in adult cattle unless precautions are taken. In experiments involving cows, diets extremely low in retinol or carotene have produced abortions, stillbirths, weakly or deformed calves, and a high incidence of retained afterbirth.

In recent years there has also been considerable interest in the winter housing of both ewes and lambs. It is known that sheep reared under natural conditions take a year or more to deplete their retinol reserves. It is also a fact that the life of a fat lamb is very short. Taking both these factors into consideration, it is unlikely that retinol deficiency will occur in sheep but it is safer to provide supplements, especially if the period indoors is extended.

P. S. Bridge, M.A., B.Sc., M.R.C.V.S., D.V.S.M., and his co-author **F. R. Spratling, M.A., M.R.C.V.S.,** are both lecturers in Veterinary Clinical Studies at the School of Veterinary Medicine, University of Cambridge.

Research into Hop Bins

HOP drying has been carried out in the same traditional way for a great many years. Green hops are carried in open weave sacks, or 'pokes' as they are known in the business, to the kiln area. After drying and cooling the hops are pressed into sacks. These are known as 'pockets' and, when full, weigh about 1½ cwt and stand nearly 8 ft tall. Once 'pocketed' the hops are ready for dispatch.

Today a few hop growers have replaced the 'poke' by highly mobile bins. In 1964, Mr. Pat Tompsett of Marden, Kent, erected his new-style building to make practical use of this idea. He began by using a single tier of bins for drying his hops. His progressive thinking and a work study investigation by the Agricultural Land Service has now shown the probability that two-tier systems could be even more successful. This development increases throughput and reduces drying costs. Waste heat which escapes through ridge ventilation could be used to help dry the second tier of hops. Monotonous manual labour has been cut to the minimum. The bins are on freely-running castors and all lifting is done by electrically-operated hoists. In about 40 man/minutes a load of hops 2 ft deep can be placed ready for drying on an eighteen feet square kiln. In the old system, besides humping 'pokes' around the men walked over 16 miles during a three-week season. In the new system they only walk about 4 miles. A further study made last season revealed that three men could easily handle over 3,500 cubic feet of green hops, or about 30 pockets per day. It may well prove possible for five, if not four men to handle 60 pockets per day. The only restriction left on throughput is now the drying time.

This bin system would seem to have much to commend it. Today the conditions under which men work must receive more attention and Mr. Tompsett and his men are sure that they benefit from the new system. This is by no means the end of the story. Research and investigation are continuing. It is hoped that a more detailed report of the work so far done by the Agricultural Land Service will be published next year.

E. R. BUTLER

Intensive Cereal Growing

Philip Bolam **Introduction to a Series**

A FEW years ago those bold folk who took four cereal crops in rotation or three crops in succession risked social ostracism in the parish. Tenants faced coolness from their landlords, and penalties for broken farm agreements; neighbours assumed that bankruptcy was imminent or the occupiers were 'farming to leave'. Of course there was some justification for the traditional safeguards when muck, the grass root and a little straight fertilizer were the basic fertility builders and a variation of crop was the major control of fungi, insects and weeds. Now we hear of four successive winter wheats, six spring wheats, or so many barleys that they disappear into the next decade. What a change! The plant breeder has given us a stiff straw on which to produce much more grain, thus opening the door to levels of fertilizer hitherto impracticable.

Two startling trends

Statistics are dull and often meaningless, but the annual farm statistics continue to highlight two startling trends: the continuing shrinkage in our labour force and the great increase in the cereal acreage. Clearly, these two factors are closely related. The cereal crop is relatively easy to subject to an integrated mechanized system and harvesting at an alarming speed can be handled by gangs of three men. Capital is required but the potential savings are great in the cereal areas.

If 1950 is used as a base line, the period until 1955 saw a reduction of 12 per cent in the cereals, a reflection of farmers' reaction to decontrol and their desire for a return to grass and stock on so-called unsuitable soils. But after another 11 years (1966) the trend has been completely reversed, with two million extra acres in grain. As one would expect, traditional grain-growing counties like Norfolk steadily increased their cereal acreage year by year, but the more traditional grass counties, after an initial drop in their arable acreage, have begun to follow in the footsteps of the eastern counties. The fact that Devon's barley acreage in 1965 almost reached 50 per cent of the Norfolk crop must be significant. 'East for crops and west for grass' seems outmoded, or at least the theoretical dividing line has been pushed much farther west.

Changes in the proportion of the various cereal acreages are interesting too. The wheat acreage mainly reflects the autumn weather conditions, but the profit motive has eroded the oat and dredge corn acreage by 82 per cent over the last 15 years down to less than 500,000 acres. The barley story is quite different. This crop has risen by more than 200 per cent and at present stands at a record figure well in excess of 5 million acres. The figures for wheat, barley and oats seem to indicate that when intensive corn-growing is discussed this is most likely to be intensive barley growing.

The chalk and limestone farmers were in the forefront of this trend. There were fears that both grain yield and soil humus would drop steeply after the second or third barley crop but these fears lessened as experience was accumulated. Intensive cereal growing on these soils became a talking point over much of the country, so that many farmers on other soils copied these cropping patterns and, in doing so, some were not too successful. Mass publicity is a blunt instrument but it persuaded some farmers on the heavy, poorly-drained soils to try intensive cereals. The result was often tell-tale patches of sickly corn riddled with take-all, and on the lightest soils, drought and wind erosion were added to these hazards so that by the third cereal crop yields could be most disappointing.

Some pertinent questions

Whilst intensive cereal growing is really an extensive farming system compared with milk production from intensive grass or cash root and vegetable growing, it still demands great skill, a major point so often overlooked. On the larger farm, at rents of, say, £3 per acre, it has developed into an attractive medium-output/low-cost system, allowing the first hope of an industrial five-day working week. But costs are rising insidiously, so perhaps it is now pertinent to ask several questions about the intensive cereal systems. How many farmers are interested in this form of cropping? Should spring barley be the mainstay? If land values and rents increase, can we accept lower yields in the face of increasing fertilizer and herbicide costs?

A recent N.A.A.S. survey looked at the cereal rotations of 473 Bedfordshire farmers, with the following results:

	%	Nos.
Farmers who have *not* taken as many as four successive cereal crops	57·7	273
Farmers who are taking at least four successive cereal crops	36·8	174
Farmers who have taken four successive cereal crops but have given it up	5·5	26
	100·0	473

Thirty-six per cent were currently taking at least four successive cereal crops. Many farmers took winter wheat as the first crop but fewer took it as the second. Thereafter almost all grew spring barley. Some who reverted to fewer cereal crops did so because of take-all and eyespot, particularly in the second or third wheat crop. The intensive cereal farmers thought they were only losing 1–1½ cwt in yield with a long run of cereals compared with more frequent break crops. This was confirmed in Huntingdon where a similar N.A.A.S. survey involving 827 farms showed that 79 per cent had not attempted four successive cereals, but 16·6 per cent had done so successfully and 4·4 per cent had abandoned the practice. The indications are, in these

areas, that successful intensive cereal growing is 4–7 times commoner than failure. Whilst a high proportion of farmers in Huntingdonshire, as in some other arable areas, grow fewer successive corn crops, this probably reflects the greater opportunity for high-value break crops such as sugar beet, potatoes, field-scale horticulture, vining peas, etc., quite as much as a dislike of intensive cereal growing.

There are the delightful, if apocryphal, tales of farmers returning from the south of France twice a year to look after their cereals. At least this highlights the embarrassing labour pattern of a sowing peak, a harvesting peak, and relatively little to do in between. Where the cereal machinery is used for a break crop such as herbage seeds, this has little effect in evening-out these peaks. Formerly casual labour might have helped with the work at sowing and harvesting, with regular labour quite adequate for the rest of the year, but with straight corn drills sowing more than 50 acres a day and 10 ton per hour combines, the position is reversed. A small regular staff can cope with the peak work but is not too gainfully employed for the weeks in between.

Getting higher returns

The intensive cereal grower must harvest every cwt of grain he can. It is not sufficient to accept medium yields and slash costs. Many farmers have already streamlined their systems, but costs are rising too quickly. The grower must find the cereal variety giving the highest return for his soil type, the minimum cultivations consistent with controlling annual and perennial weeds, and not so severe that soil moisture is lost in the spring. He must also use varieties which provide a good sequence of ripening. Losses through combining too late are an ever-increasing source of worry and the green, grain-sprouted stubbles are their own silent comment to those who insist on every field being dead ripe before combining. A farmer with a low labour force, only two cereal varieties, and a vast corn acreage can usually find too much of his crop 'on the floor', particularly with the 'shake' winds so dreaded in the north of England.

Perennial weeds are the 'Achilles heel' of intensive cereals, and controlling them demands farming skill. Couch and black grass carry take-all, and black grass is a host for the frit fly as well. Wild oats spoil a grain sample and, like the other two, reduce grain yield by competing with the corn for air, moisture and plant food. Practical farming experience at Boxworth Experimental Husbandry Farm suggests that stubbles full of couch and water grass should be cultivated or sprayed immediately after a harvest. If, however, wild oats predominate, the stubble should remain untouched well into the autumn to allow the birds to eat the wild oats. In this case stubble cultivations only encourage more wild oats next year. Straw and stubble burning help to reduce the wild oat population but spring operations are much more valuable. A false seedbed made in March encourages the growth of wild oats and one good stirring of the soil in the third week of April, when germination has finished, gives a tremendous 'kill'. One of the new spring wheat varieties may be used on the heavier land, but barley is more suitable for a late crop on the lighter soils. A heavy crop is still the cheapest way of suppressing most of the weakened weeds. Ten wild oats to the square yard seems the critical level for this treatment. With fewer wild oats, late drilling can reduce barley yields by 6 cwt per acre but with heavier infesta-

tions the later sowings may yield 5 cwt per acre more than those sown earlier. Killing grass weeds and wild oats with chemical sprays offers hope, but there is no guarantee of 100 per cent kill and these chemicals can add to the cost of growing the crop.

Variations in yield

In west Cambridgeshire, G. J. Clarke found a swing towards spring wheat and away from spring barley. Recently-introduced varieties such as Opal are heavier yielders than Atle by about 6 cwt per acre. Yields of two tons per acre have been recorded and, even more important, several crops in succession have produced little evidence of take-all. On the heavier soils there could be little drop in spring barley yields even after a ten-year run, but on the chalks the crop could reduce by 7–8 cwt per acre after seven years.

THE AUTHOR

This article has been contributed by **Philip Bolam, M.Sc.,** who is County Agricultural Adviser for Norfolk in the National Agricultural Advisory Service.

These chalk soil trends seem confirmed in Wiltshire and Dorset but with greater yield variations. Those who have controlled their grass weeds have maintained their yields longer than those who have accepted dirtier stubbles. Yields can be reduced by 7–10 cwt in ten years of successive spring barley crops (Connold, *Agriculture*, September, 1966). Some find that after the third or fourth straw crop, there is need for an additional 10 units of nitrogen per acre per year up to 120 units.

Investigations at High Mowthorpe, Bridget's and Boxworth Experimental Husbandry Farms indicate that, provided more than 80 units of nitrogen are applied, spring barley yields can be maintained with a drop of only 2–3 cwt per acre under an intensive cereal system. The famous Sykes Field at Boxworth, which in 1965 carried its sixteenth successive cereal crop, has yielded 35 cwt of winter wheat per acre over the last six years. In normal practice, however, the risks of continuous winter wheat cropping are high and they increase the further they are away from the break crops.

At Gleadthorpe Experimental Husbandry Farm on a poor Bunter sand, the humus level is important. Above one per cent humus in the soil the risks are moderate, but when the humus level drops below this, plant growth

and yields are on the slippery slope. A good humus level means a good crop growth. A good crop growth, in turn, means sufficient crop residues to maintain a reasonable humus level. On the other hand, a poor crop means poor crop residues and consequently depression in soil humus. If this continues and no humus is introduced the farmer will quickly spiral down to disaster. In a rotation of four cereals and two root crops at Gleadthorpe, the organic matter has only declined by 0·2 per cent in six years even where straw was not returned. There is a sharp decline in yield with the third cereal crop, even spring barley.

Costs and margins

What then are the financial implications of a long cereal run? It is obviously impossible to produce one set of figures for all soil types. Fertile, well-bodied loams yield much more wheat than the lighter soils, but using average figures such as:

	Wheat	*Barley*
	£	£
Gross output	38	35
Seed and fertilizer	8	7
Other variable costs	4	3
Total variable costs	12	10

then the gross margins are £26 and £25 respectively. Again, fixed costs vary from farm to farm, but again using average figures they are likely to be of the following order: rent £5, machinery £7, labour £5, sundries £2: total £19. The net farm income is £6–£7 per acre. Farmers with a high proportion of cash roots would have greater labour and machinery charges, but they would not be so interested in long cereal runs.

Costs are rising, and on some soils yields are falling with successive grain crops. If a £9 per acre rent was asked, the net farm income would almost disappear. This is the burning issue with intensive cereal production. In looking at costs, nitrogen rates are obviously increasing, but are we too inclined to use the more expensive, sophisticated weed-killers as routine, when cheaper, simpler ones might be adequate in some years?

Labour and machinery

It is difficult to reduce direct labour and machinery costs much below £12 per acre. On the large acreage, the straight corn drill, bulk fertilizer spreading, large tractor and equipment, together with simple drying and storage arrangements can each make an impact. Successes with chisel ploughing and broadcasting seed have been reported, but too little is known about these methods on all soil types. It would be foolish to be dogmatic. Substituting higher machinery for lower labour costs may ease a shortage of workers, but if the combined figure is not under £12 per acre the position has not altered. Some farmers have bought themselves out of labour difficulties by a massive capital investment, which would not stand critical examination. The capital cost per ton could be frightening. Perhaps there is still room for saving by careful planning. In a recent harvesting investigation, 510 acres of grain were harvested, dried and stored with three men

in 19 days. The harvesting rate was 5·9 tons/hour inclusive of all maintenance time. A neighbour with similar acreage and yield used 7 men for 29 days!

Break crops

Can break crops help to increase output from the intensive cereal system? Comparing Sykes Field and wheat after beans, E. R. Bullen (*Agriculture*, March, 1966) suggests that there may well be a difference of 10 cwt in favour of the cereals after the bean crop, but continuous wheat is hazardous on many soils anyway. The break allows at least one wheat crop with a higher output before returning to barley. Bullen implies that unless the break crops are giving a high return there is little point in substituting an alternative which will only cover its costs. Most high-return break crops, such as sugar beet, potatoes, vining peas, field-scale vegetables or intensive grassland require quotas, contracts, more labour or appreciable extra capital. Break crops using cereal equipment such as beans, herbage seeds or oil seed rape may give outputs exceeding those of cereals but this depends on locality and soil type.

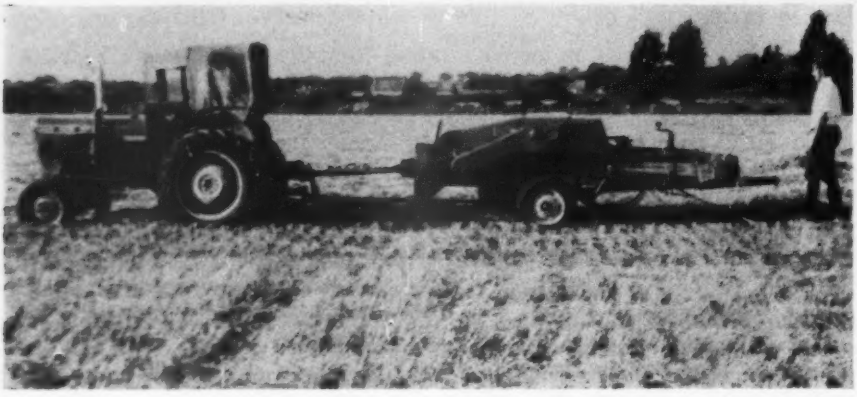
Over the last two decades, the plant breeders have given us varieties of grain with increasing yield to keep pace with rising costs. Let us hope they can continue to do so. As with other aspects of farming, intensive cereal growing is not as simple or straightforward on many soil types as it would first appear. If the soil is such that the first crops yield near two tons per acre, this allows for a yield decline in which the odd break crop may prop up the output of grain. If, on the other hand, the early crops do not exceed 25 cwt of grain per acre, it is doubtful whether the soil type is suited to this system.

Oxford Farming Conference

Twenty-first Birthday

The 1967 Oxford Farming Conference will celebrate its twenty-first birthday by 'Taking Stock' of the agricultural industry and its problems.

Programmes for the conference, to be held from 2nd to 4th January, 1967, in the Town Hall, Oxford, may be obtained from M. H. R. Soper, Hon. Secretary, Oxford Farming Conference, Department of Agriculture, University of Oxford.



A Small Machinery Syndicate

M. G. Fenn

In the spring of 1964 four neighbouring farmers in the parish of Lound, in East Suffolk, decided to pool some of their major machinery. Their object was partly to reduce overhead costs but mainly to assure themselves of better facilities for drilling and harvesting their sugar beet and corn. The four adjacent arable farms were roughly the same size, averaging 75 acres each, and the annual hiring, borrowing and lending of machinery at the peak seasons was a growing anxiety.

The result was the formation of a small machinery syndicate operating a combine harvester, a baler, a precision root drill, a sugar beet harvester and some ancillary equipment, such as augers and a grain tank. The syndicate is now in its third year of operation.

The need for rules

The four farmers had no previous experience of machinery syndicates but they were well aware that, in the rush of sugar beet drilling or the worry of a wet harvest, the co-operative spirit is apt to recede. Accordingly they decided that they should reinforce common sense on this point by a detailed set of written rules which would leave the least possible room for doubt about any member's rights and duties in the use of the machinery. The existence of these rules serves not merely to settle controversy but tends to prevent it from arising.

It is obviously impracticable to devise rules so complete that the need for voluntary give and take between members is cut out completely. This was one reason for limiting membership of the syndicate to four farmers who had compatible methods of working and who respected each other's sense of fair play. Without this respect, the syndicate would not have been formed.

Secretarial work

It was obviously important to the four working farmers concerned to keep down administrative work and costs. From the beginning, one of the members was nominated as secretary and detailed formal accounts have been maintained for each machine and its operations. The syndicate has its own bank account and for this purpose it was necessary to register a business name with the Registrar of Companies for a fee of five shillings. To meet Inland Revenue requirements, the syndicate's profit and loss account and balance sheet are professionally audited. Total administrative costs (banking, auditing, stationery, etc.) have averaged £6 per year.

Provision of capital

The original capital was subscribed by the four members in equal shares to purchase machinery as follows:

		£
Combine harvester	(secondhand)	1,030
Precision root drill	,,	180
Baler	,,	375
Auger	,,	40
Sugar beet harvester	(new)	479
Grain tank	,,	68
Auger	,,	55
Spraying equipment for drill	,,	88
	Total	2,315

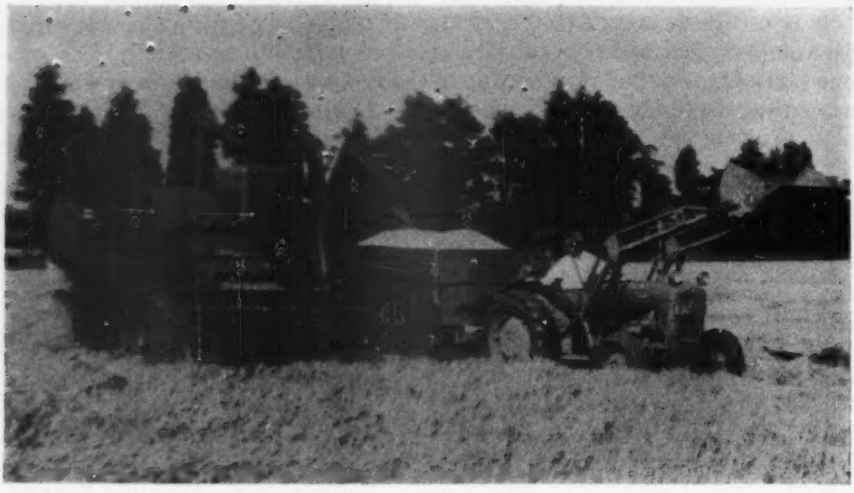
The precision root drill, baler and one auger were taken over from individual members at prices set by independent valuation. Cash to maintain a small reserve has also been subscribed by members in equal shares as and when required.

Operating arrangements and charges

After each machine has finished a season's work, it is valued (free of charge) by a local agricultural engineering firm so that depreciation can be assessed. The figure for depreciation, plus running expenses and repairs, is then taken as the total operating cost of the machine and this is charged out to the four members in proportion to the acreage for which each has used the machine. Each member then settles his accounts with the syndicate annually for each machine.

The syndicate does not seek outside contract work but finds that it can meet such requests from time to time without inconvenience to its own members. The revenue from this work is distributed equally after direct payment of labour costs.

Each member is responsible for the operation of the syndicate's machines on his own farm, so that labour does not appear in the calculation of operating costs. In practice, labour is frequently exchanged and members make direct settlement between themselves where necessary.



The Machinery Syndicate's combine harvester in operation

Individual responsibilities for the storage and care of each machine between one working season and the next have been agreed and modest storage allowances have been fixed.

Costs of operation in practice

In 1964 and 1965 the machinery operating costs per acre have proved to be:

	Cost per acre (*labour excluded*)		Current contractors' rates (*labour included*)
	1964	1965	
	s.	*s.*	*s.*
Combine, augers and grain tank	52	64	80 to 90
Precision drill with band sprayer (excluding cost of spray)	18	18	35 to 40
Baler (including cost of twine)	22	19	40 to 65
Sugar beet harvester	125	62	200 to 240

As already stated, these figures represent the depreciation, running and repair costs of the machines only; members are responsible for providing operators and towing tractors for the drill and sugar beet harvester. Even so, it is obvious to the members that their work has been done far more economically than would have been possible either through individual ownership of machinery or by the use of contracting services.

There will inevitably be times in a wet spring or a wet harvest when all four members would wish to use the machinery on the same day and a good deal of forebearance is demanded. But this is a very occasional disadvantage and is far outweighed by the economies and convenience enjoyed under usual conditions. Co-operation, within a framework of clear commonsense rules, is not a difficult habit to acquire and the members are satisfied that the rewards are worth the effort.

Beef Production in the North

Walter R. Smith

THE Northern Region comprises five counties: Northumberland, Cumberland, Westmorland, Durham and the North Riding of Yorkshire. Except for the heavily populated industrial areas around the lower reaches of the Tyne, Wear and Tees and the south-east Northumberland and north Durham coalfields, agriculture is the most important industry. There are nearly four million acres of land in agricultural use, two-and-a-half million acres under crops and grass and one-and-a-half million acres of rough grazing, mainly in the Cheviots, Pennines and Lakeland. This land supports 500,000 dairy cattle, 650,000 beef cattle and 3,750,000 sheep, and, in addition, produces over 800,000 tons of grain. Much of this is barley, which is fed to livestock. Livestock and livestock products, therefore, contribute the greater part of the agricultural output. It will be seen from these figures that, together with dairying and sheep farming, beef production is of great significance. In Northumberland it is the predominant enterprise.

Beef production systems

In the region generally, beef production systems are broadly of three kinds:

1. Beef breeding herds (known locally as suckler herds) kept on livestock-rearing land and supported by the Hill Cow Subsidy Scheme (with winter keep grant this amounts to £18 a cow): suckler herds kept on farms outside the livestock-rearing areas, now eligible for the £6 10*s*. a cow grant.
2. Fattening of purchased stores, home-bred and Irish, on grass in summer and to a more limited extent indoors in winter.
3. The rearing and/or fattening of purchased calves from dairy herds, largely Friesian steers and beef dairy crosses.

Suckler herds

With one-and-a-half million acres of rough grazing and a substantial proportion of the one million acres of permanent grass classed as livestock-rearing land, it is not surprising that there are well over 100,000 suckler cows in the region.

Aberdeen Angus crosses, Shorthorn and Hereford, many of Irish origin, account for the greater part of the breeding cow population. In the high rainfall areas Galloway and Blue Grey cows predominate, the Galloway still retaining its position under the more extreme climatic conditions.

On the sire side, Aberdeen Angus bulls used to be the predominant breed. In recent years, however, they have lost much ground to the Hereford. There are two reasons for the marked increase in the use of the Hereford. First, its higher growth rate and, secondly, since cattle are slaughtered at lighter weights and younger ages, the breed and its crosses are now much more acceptable to the meat trade.

Except in the case of large units, herd replacements are normally purchased. Breeders prefer large-framed heifers which are likely to develop into long-living mature cows. Surveys have shown that the average herd life is 7 to 8 for females and 5 to 6 years for bulls.

Galloway cow and Blue Grey calf on the uplands

Wintering and early calving

Systems vary widely. On better land in-wintering is favoured, usually to reduce poaching of improved grassland. Appreciable investment has gone into covered yards, silos and hay barns grant-aided under Hill Farming and Livestock Rearing Schemes. In the high-land areas, although in-wintering is preferred, many herds are never indoors because of lack of accommodation and the high cost of new buildings.

The economic advantages of early winter compared with late winter or spring calving have become firmly established in the minds of those farming lowland and the better marginal land. This is reflected in the thousands of well-grown weaned calves presented at the autumn sales.

Small weaned calf problem

On higher exposed farms the environment and resources militate against early calving and April/May calving is common. The result is a crop of small weaned calves of low value. If sufficient fodder and accommodation are available, the calves are kept over winter and sold in spring at much better prices than they would have realized in autumn.

Those farmers who are forced to sell small, inferior sucklers in autumn make, at best, a small profit. This situation has led the N.A.A.S. to question

the practice of maintaining breeding herds on poor upland farms. Undoubtedly Hill Cow Subsidy is attractive, but having taken this into account, the returns do not justify the practice. Early calving is not practicable; summer grazing is too poor to stimulate sufficient milk in the cows to achieve good growth rate in their progeny; winter fodder is limited and too expensive to buy in quantity. Farmers in this situation would be better off with an alternative cattle enterprise, for example, the rearing of bought-in calves or the summering of cattle on the hill, probably on an agistment arrangement.

Feeding

Except on poor-land farms, the feeding of suckler cows is very much improved and generally satisfactory. Fodders are normally adequate in quantity but lacking in quality, especially for late pregnancy and early lactation. Supplementation with concentrates at critical times is now more common, largely as a carrier of high-magnesium minerals for the prevention of hypomagnesaemia, locally referred to as 'staggers'. Hay, along with swedes on some farms, is the most common fodder but silage is increasing in popularity on marginal and lowland farms. As one would expect, there is a wide range of summer stocking rates according to the potential of grassland and level of management. Surveys indicate a variation from $1\frac{1}{2}$ acres to over 3 acres per livestock unit on lowland farms and from 3 acres to 10 or more on upland farms.

Intensification

In general it can be said that there is scope for intensification at all levels. Indeed, intensification is gradually taking place through grassland improvement, increased use of fertilizers and better conservation. Over the past ten years one upland farmer has increased herd numbers from 50 to over 100 without housing or reducing sheep numbers. Such examples are commonplace. But on a number of farms a point has been reached when housing would be necessary should intensification be carried further.

This situation has raised management problems and consequential exercises for N.A.A.S. advisers.

The production of suckler calves is a long-established enterprise in the region, especially in Northumberland, with its extensive upland grazings and large-scale farming. Shrewd, forward-looking farmers are thinking of making changes in the traditional pattern, but before doing so they are conducting their own private trials as well as watching official trials. Issues such as breed or type of dam, time of calving, winter feeding systems and grazing management are involved. In this context the introduction of Friesian cross dams, the performance of Charolais crosses, autumn calving and spring weaning, and on cereal-growing farms the use of straw and cereal as winter feed, are some of the possible changes currently studied.

Fattening of purchased store cattle

Grass fattening is traditional and still widely practised, especially on the eastern side of the region. Store cattle, home-bred or Irish, are bought in late winter and early spring, and, under the best management, stocking rate

is matched to grass growth, reaching a peak about mid-May. Set stocking is almost universal, either with or without sheep; mixed stocking is still popular. Much of the fattening is done on old permanent grassland liberally treated with basic slag, but only limited use is made of nitrogen.

In the last few seasons store cattle have been expensive to buy in spring. Fat cattle sold in late summer and autumn have realized lower prices per cwt than they cost as store cattle. This situation, coupled with moderate output per acre on traditional stocking rates, has resulted in low profits. Economic trends point to the need for greater intensification through some increase in the use of nitrogen, better grazing management and more even distribution of marketings over the grazing season. Nevertheless, some farmers continue to make grass fattening pay well, by shrewd buying, good management and competent selling.

The significance of grass fattening is illustrated by the number of Irish cattle imported into the region—around 100,000 of which 50,000 or so are finished in Northumberland. This is additional to an even greater number of home-bred stores.

Winter fattening

Indoor fattening of strong suckler calves and older cattle, home-bred and Irish, is an important enterprise. Hay, roots and high-cereal concentrates are still the most popular fattening diets, but the root acreage is declining and there is more interest in silage. With older heavier cattle, silage feeding presents few difficulties, but in the case of lightweight young animals (8 cwt) there are problems associated with low silage intake. Hence the interest being taken in wilting and chopping and easy-feed techniques. Barley beef was never adopted by the north country farmer. He soon realized that this high-cost vulnerable system could not be the long-term answer to economic beef production.

Beef from purchased calves

As in other parts of the country, there has been a marked swing to pure Friesians and Hereford/dairy crosses. Many are moved from the dairy farms of the west to rearing farms in the east. Early weaning at 5 to 6 weeks is almost universal. Unsuitable calf housing and large 'batch rearing' have produced problems from time to time, e.g., Salmonella infection, scours and respiratory disorders. Nevertheless, rearing management is generally good. Calves in the bigger units are normally carried on to slaughter at ages varying according to feeding systems, from 18 months up to about 30 months. They are either finished on grass or in yards, and many farmers practise both methods. Calves reared on small farms are normally sold as stores at about 18 months old and this system will continue for many years to come.

Marketing

A most significant feature is the marketing of fat cattle at young ages and lighter weights compared with older heavier animals of a few years ago. Many are now sold at 9–10 cwt live weight, but there is still a steady demand for animals of around 11 cwt. In fact there is a market for all classes of cattle for a variety of outlets. The northern farmer prefers to sell on the hoof at auction marts—the drama and the social side of these still retain their appeal.

Research and development

A description of beef production in the north would not be complete without reference to work at Cockle Park, research farm of the University of Newcastle upon Tyne. Against a background of increased costs of land, labour and capital in British farming generally, the Cockle Park work has been designed with the object of increasing output of beef using different husbandry methods. Briefly these are:

(*a*) The intensive use of grass integrated with the feeding of home-grown barley. Autumn-born Friesian steers and beef/dairy crosses are reared indoors, intensively stocked on grass at two beasts an acre, growth of frame rather than production of flesh being the object. They are fattened in winter, at 18–20 months, on high-quality fodders supplemented with high-cereal concentrates. The system is profitable.

(*b*) On the Paradise unit, beef cattle and ewes and lambs are managed on a complementary grazing system, with silage conservation, at high stocking rates of both species. The results of three years' exploratory work have shown that this system makes possible the production of about 300 lb carcass meat per acre, value £45 at 3*s*. per lb.

(*c*) The production of the 'bred heifer' (cow heifer). Charolais cross heifers mated at 12 months have been fattened off at about 27 months, after suckling their calves for three months. The pilot trial has shown the system to be technically feasible. The 'bred heifer' produced more meat of at least equal quality to that produced from a 'clean' heifer, in addition to breeding a beef calf.

(*d*) The production of beef calves on cereal-growing farms. In this investigation the concept is intensive use of a limited acreage of grassland by a suckler herd wintered on a diet of barley straw and cereals with a protein supplement of urea. Hereford x Friesian heifers were fed in this way last winter, calved in spring, and have spent the summer suckling their calves at pasture. Their performance has been encouraging.

From the description of beef production in the north, it will be appreciated that traditional systems are currently practised. The trend so far is the intensification of these traditional systems, but greater changes may yet have to be made. The experimental work at Cockle Park could form a basis for the future development of more intensive husbandry systems.

A north-countryman himself, the author of this article, **Walter R. Smith, B.Sc., N.D.A.,** is at present Director of the Northern Region of the National Agricultural Advisory Service. In January, however, he will be moving to Headquarters in London on promotion to the new post of Deputy Director of the N.A.A.S. Mr. Smith was closely associated with the testing of the Charolais breed under British conditions and co-ordinated the Ministry trials.

Starting a Business

G. H. Camamile and E. S. Carter

ANYONE who is planning to start farming on his own—or begin a new partnership—should give particular consideration to the ways in which the profits may be assessed for tax in the early years of the new business, because, for these years, special rules apply. The reason for the special rules, and indeed why they are so complex, is that the normal basis for an income tax assessment on trading is the profit for the preceding accounting year. How to progress to this 'preceding year' basis from the start is the problem which commencing rules try to solve.

Income tax years

Before we go any further, however, we should perhaps explain that the expression 'year of assessment' is as a rule used to describe the income tax year for which tax is charged. Thus the year of assessment 1967-68 means the income tax year from 6th April, 1967, to 5th April, 1968 (see our note in the November issue of *Agriculture*). For our purposes, however, we shall stick to the expression 'income tax year'.

Commencing rules—normal way

At the beginning of a business the rules of assessment are:

(*a*) For the income tax year in which the trade starts, the assessment is based on the actual profits of the period from the commencement to the following 5th April, apportioned on a time basis, if necessary, from the first accounts.

(*b*) For the second income tax year in the life of the business, the assessment is based on the profits for the first twelve months of trading—again apportioned from the first and second sets of accounts, if necessary.

(*c*) By the third year it will usually be possible for the results of the full accounting year ended in the preceding income tax year to be used, i.e., the normal 'preceding year' basis. If for some reason this is not possible, the Inland Revenue can choose as a basis for the third income tax year's assessment any twelve-month period ending in the two years they like. The period taken is usually of twelve months up to the future accounting date or, if this is not possible, the first twelve months of trading.

Some examples will show how this operates under different circumstances.

Example 1

Joe Amber started farming on 6th April, 1965, but decided that he would have his accounts made up to 31st December in each year. His first accounts, for the period to 31st December, 1965, showed a profit (adjusted for tax purposes) of £825. His second accounts, for the full year 1966, show a profit (adjusted for tax purposes) of £3,820. The income tax assessments will be (before deducting allowances for machinery and vehicles):

		£	£
1965-66			
(actual)			
6–4–65 to 31–12–65		825	
	$\frac{3\frac{5}{8}}{12} \times$ £3,820 =	1,008	
			1,833
1966-67			
(first 12 months)			
	as above		1,833
1967-68			
(preceding year)			
1–1–66 to 31–12–66			3,820

Example 2

Fred Gray started his farming, however, on 1st January, 1965, when he took over a farm following the death of his father. He decided that he would like his accounts prepared to 30th June in each year and, for fairly obvious reasons, his first accounts were made up for an eighteen-month period to 30th June, 1966. These showed a profit (adjusted for tax purposes) of £1,025. The next year, ended 30th June, 1967, turned up a profit of £7,140. This shows how it is possible for one long trading period to form the basis of several assessments.

The first assessments (again, subject to the deduction of depreciation or capital allowances for machinery and vehicles, which are worked out separately) will be as follows:

		£
1964-65		
(actual)		
	$\frac{3\frac{5}{8}}{18} \times$ £1,025 =	180
1965-66		
(first 12 months)		
	12/18 × £1,025 =	683
1966-67		
(period of 12 months ended on 30th June, 1966—usual)		
	12/18 × £1,025 =	683
1967-68		
(12 months to 30th June, 1966)		683
1968-69		
(year ended 30th June, 1967)		
	Preceding year	7,140

Alternative basis—taxpayer's option

These rules could obviously produce some inequalities, and there is therefore an alternative basis which is available *only at the taxpayer's election*, made within definite time limits. This alternative is that the assessments for both the second and third years, but not for one or the other only of those years, shall be on the basis of the actual profits.

Example 3

John Olive's adjusted profits for his first three years' trading were:

	£
Year ended 5th July, 1965	7,142
Year ended 5th July, 1966	3,174
Year ended 5th July, 1967	5,088

The normal assessments would be:

1964-65	
(actual) 9/12 × £7,142 =	5,357
1965-66	
(first 12 months)	7,142
1966-67	
(preceding year)	7,142
1967-68	
(preceding year)	3,174

But John Olive, the taxpayer, can elect to have the second *and* third years' assessments based on the actual profits of those years, thus:

	£	£
1964-65		
(actual as before)		5,357
1965-66		
(actual)		
3/12 × £7,142 (y/e 5-7-65) =	1,785	
9/12 × £3,174 (y/e 5-7-66) =	2,381	4,166 (instead of 7,142)
1966-67		
(actual)		
3/12 × £3,174 (y/e 5-7-66) =	793	
9/12 × £5,088 (y/e 5-7-67) =	3,816	4,609 (instead of 7,142)
1967-68		
(preceding year, as before)		3,174

A reader who has followed these examples carefully will have seen that, whilst the result will almost always be fair to the taxpayer, the calculations can often be complicated. The next note in this series shows the other side of the coin—what happens when the existing business comes to an end or changes ownership.

(This is the fourth note in the series 'Tax in Perspective'. A fifth note will appear in next month's issue of *Agriculture*)

Hop Wirework

A. F. Culley

Hop wirework is now eligible for grant-aid under the Farm Improvement Scheme along with other costly fixed equipment for this highly specialized section of the agricultural industry.

HISTORICAL accounts indicate that hops were first grown in this country in the sixteenth century following some enclosures of common lands. The acreage of hops increased to a total three times greater than today's figure and spread to many parts of the British Isles. Before the end of the nineteenth century, however, the present pattern emerged, dictated undoubtedly by climate and soil conditions in relation to yields and economic production. Today, 21,000 acres of hops are grown in sixteen counties. Of the two main concentrations, Kent and East Sussex in the South-east have 55 per cent and 9 per cent respectively of the national total: in the West Midlands, Herefordshire accounts for 25 per cent and Worcestershire 10 per cent. Hops were trained on poles until wirework was first introduced in about 1860, to come into general use before the end of that century. Height was sometimes as low as 8 ft, but settled at about 12 ft to 14 ft. It is only since the introduction of the hop-picking machine that heights started to increase to 15 ft or 16 ft, and occasionally to 18 ft.

South-east England

In the South-east, particularly in Kent, sweet chestnut has been grown in coppice for generations to provide poles for use in hop gardens. The ease with which poles have been obtainable no doubt influenced the layout of wirework with plenty of poles to the acre. Many hop gardens continued to use poles cut on the farm. Annual sales of stands of sweet chestnut coppice are still a feature in the county, and they fetch good prices per acre.

The Butcher system of wirework is still seen in east Kent. It was first used in 1875 by Henry Butcher, from whom it took its name. The system is based on poles in every row of hops, spaced two or three plants apart in the row, resulting in a density of 300 to 400 or more poles to the acre. The stringing is taken from the top wire of one row over the breast wire of the next row, down to the bottom wire close to the ground, giving a characteristic uniform slope to hop bines. The umbrella system, on the other hand, is used in north and mid-Kent as well as in the Weald and East Sussex. Usually there are between 100 to 200 poles per acre, depending on the spacing of poles. Mostly they are erected in every other row, but sometimes in every third row, spaced two or three plants apart. However, variations do occur, for example, staggered in every row at every four plants. Strings come down from paraliel wires to a central point, and are then fastened to pegs in the ground.

West Midlands

The two-string Worcester system prevails in the West Midlands. Although there is a good deal of similarity to the four-string umbrella system of the

South-east, the West-Midland hop yard has more plants to the acre than elsewhere but involves fewer poles, usually between 50 and 80 to the acre. Locally-grown poles were never plentiful and many have to be brought in from other districts. The most common timber used is larch. The construction is heavier throughout, with appreciably fewer poles to the acre. Stronger anchor wires have to be used, as well as heavier and deeper anchors, with up to 4 in. top diameter inside poles, compared with the traditional $2\frac{1}{2}$ or 3 in. in South-east England.

Influences on design

Wirework lasts a considerable time. Apart from the renewal of top wires after about fifteen years, wirework has been known to stand for thirty years or more. It is not surprising, therefore, that little substantial change has occurred this century. The mechanization of hop growing and picking since the Second World War has resulted in an increase in the height of wirework from $12\frac{1}{2}$ ft to 15 ft or 16 ft, or more. This requires complete renewal which, in view of the high cost per acre, is not normally undertaken until justified by economics or increased yields. Other events have occurred recently which have focussed attention on standards of wirework. The disastrous gales of 1965 caused havoc in the hop gardens when the plants were in full foliage and many hundreds of acres of wirework were laid flat. By the end of the same year, the proposed new Farm Improvement Scheme included hop wirework for grant-aid. This led to consultation with hop growers representing various interests in order to clarify the standards to be accepted for such aid.

The Ministry of Agriculture, Fisheries and Food have prepared a short leaflet, *Umbrella Wirework Systems for Hop Growing*, referring to the factors to be considered in constructing wirework, together with recommendations on the specification of materials. This leaflet will be freely available to those concerned with the erection of wirework and is of particular interest to hop growers intending to make application for grant-aid under the Farm Improvement Scheme.

General standards

A wirework system is like a chain which is as strong as its weakest link. Collapse of one part of the system will affect the remainder. It is thought wise for a garden or yard not to exceed ten statute acres. Where larger areas for planting are required, it is desirable to provide wirework in suitably-sized independent sections, unless shape and topography make it certain that an area in excess of ten acres of wirework will create no undue risk.

Anchorage

Although a system of wirework is a composite construction, requiring suitable wire and poles, its stability depends mainly on the strength of the anchorages and on ensuring that the poles cannot be forced downwards into the ground by the weight of the crop. Anchorage is achieved by the use of an anchor block. This is a slab of concrete or preserved timber of sufficient size, set deeply enough in the ground. An anchor rod, fastened through the block, extends to at least 6 in. above ground level, to take the anchor wires from the outside poles. It is a cardinal principle that the flat face of the anchor block, and therefore the anchor rod, is towards the direction of pull; also that the

Typical scene after hop-picking, showing modified upright umbrella system

ground in the direction of pull is undisturbed. In the South-east, where many more poles are used to help to take the strain, the anchor block is normally at least 3 ft in the ground with about $1\frac{1}{2}$ sq. ft of flat surface, i.e., not less than 2 ft 6 in. long × 6 in. × 4 in., bearing against firm undisturbed soil in the direction of pull. On the other hand, for the Worcester system, prevalent in the West Midlands, a flat surface of usually not less than 3 sq. ft is essential to support the wirework system, which seldom has more than 50 to 80 poles to the acre. Sometimes whole railway sleepers, first grade, have been used. The point at which the anchor rod emerges from the ground is normally a distance from the base of the poles equal to the height of the anchor wire fastening on the pole. This gives a 45 degrees angle to the anchor wire depending on the slope of the pole, always preferably 10 degrees outward from the vertical. The operation of inserting anchor block and rod as well as maintaining proper alignment to give straight pulls requires considerable care and skill.

Poles

All posts must be carefully selected, with preference given to slow-grown straight poles, which need to be peeled. Gardens are expected to last many years to justify the expense incurred and therefore preservation of timber is a necessity. In South-east England it is traditional for the sweet chestnut pole to be butt-treated by steeping in creosote, which is heated to between 180 and 200 degrees F, maintained for some two hours. The butts remain in the creosote when it is allowed to cool. Many hop farms have a hot and cold creosote tank. Unless poles are sawn from the heart-wood of sweet chestnut, oak, larch, yew or western red cedar—and this is exceptional—they should be preserved over the whole length by impregnating under pressure or by hot and cold steeping with a suitable preservative, traditionally creosote.

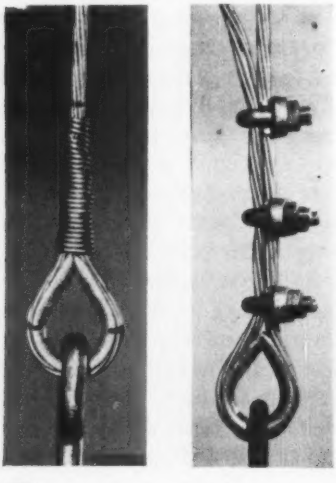
There are three main categories of posts. A special one is required for the corner, and this is often held by four anchorages because the strain is greatest at this point. These poles are normally not less than 6 in. top diameter in South-east work. In Worcester work, where there are far fewer inside poles, they are usually not less than 7 in. diameter where hop yards do not exceed five acres, but go up to not less than 10 in. where the yard is up to ten acres.

Stack of sweet chestnut poles, peeled and butt treated

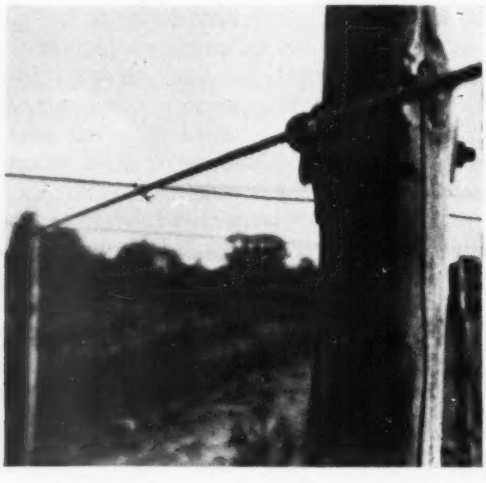
These posts are provided at each corner of the garden and at each major change of direction of the boundary wire. They are always set at least 3 ft in the ground in stable soil but sometimes a pad of stone, concrete or preserved timber has to be provided to prevent settlement. Outside posts occur at each end of the bearing wire line and at the end of every row of poles in the other direction. The top diameter is not less than 4 in. and the posts are sunk at least 2 ft in the ground. A pad-stone is only used when it is judged to be necessary. These poles are provided with at least one anchorage each and are set so as to lean outwards at about 10 degrees from the vertical.

Inside posts are evenly distributed throughout the garden. In the Worcester system, because there are fewer posts per acre, a top diameter of 3 in. is regarded as the minimum size. The number of inside posts depends on whether each line of poles is at every fourth row of hops, or at every other row where the wire is 16 ft high or more. There is some variation of distance of poles in the row. In the South-east it is only where the density of poles is 148 or more per acre that there is some relaxation in size of poles to a $2\frac{1}{2}$ in. top diameter. In both areas, posts have a flat sawn base and are set at least 1 ft in the ground.

The use of thimbles with:
Post Office wrap *Bulldog grips*



Hook bolt in use. In the background is seen the clipping of the parallel wire over the bearing wire



Wire

The wire used is made up of galvanized strands of different gauge and the loads or strain at different points dictates the choice of wire for that particular purpose. There are differences in gauge between the Worcester and the South-east work. In the West Midlands a $\frac{1}{2}$ in. diameter $\times$ 7 ply is desirable for anchor wire as fewer poles exist to take the load, but for the South-east a 00 gauge $\times$ 7 ply is common. The bearing wires in Worcester work are heavier, normally 00 gauge $\times$ 7 ply, compared with 1 gauge $\times$ 7 ply in the South-east. For the parallel wires, the size in the Worcester work is invariably 6 gauge $\times$ 7 ply. In the South-east, 8 gauge $\times$ 5 ply is used but there is a tendency to increase this to 6 gauge $\times$ 5 ply to give additional strength in larger gardens. A heavier wire is sometimes introduced across the garden at regular intervals. It is interesting to note that parallel wires are clipped on top of the bearing wires in South-east work, using 14-gauge hop clips, whereas in Worcester work the wires are joined together by twisting with 1 ply from a 6 gauge $\times$ 7 ply wire. For fastening wires to posts, hook bolts are being encouraged. These are of sufficient length to pass through a hole drilled in the post and to be secured by a $1\frac{1}{8}$ in. square, slightly curved, plate washer and nut. The hook end is pointed to go into the wood and the wire, which lies between the hook and the plate, is pulled on to the post when the bolt is tightened.

Much thought has been given to methods of attaching wire. A recent innovation has been the use of a metal thimble to reduce the friction on the anchor wire where it is taken through the eye of the anchor rod. The end of the wire is often fastened by using the Post Office wrap or the solid wrap. Special grips are also available, either a bull dog grip, which is in the form of a 'U' bolt or a proprietary make known as the 'preformed grip'. For attachment to posts there is a recommended method, although in the Worcester system eye bolts in conjunction with half-moon plates are generally used to secure wires to posts. A great deal of care is required in setting out wirework. Considerable work of a detailed nature is necessary; for example, each corner and outside pole involves a fastening and each row an anchorage at both ends. Consequently, new wire is always used, but it requires careful handling to prevent kinks which are liable to spoil the galvanizing and set up rust, resulting in a weak spot. When completed, the wirework must have straight pulls and be adequately strained. All fittings should be to a satisfactory standard and be galvanized to ensure a trouble-free life for the high expenditure incurred.

The future

How quickly change will come to the hop industry is uncertain but opportunity exists for further examination of wirework systems. There is at least one continental system using special poles at a very low density to the acre. Research continues at Wye College, and if this leads to cheaper and simpler provision of wirework, it will be of benefit to those faced with the renewal or provision of wirework because of new developments in the hop-growing industry.

This article has been contributed by **A. F. Culley, F.A.I.**, who has been in the Ministry's Agricultural Land Service since 1948. He is now Divisional Land Commissioner for Kent, and as such has been specially concerned with the standards to be adopted under the Farm Improvement Scheme for wirework and other items of equipment for hops.

Beef and Veal in the Common Market

R. C. Rickard

MEASURES for the gradual establishment of a common market for beef and veal in the European Economic Community finally came into being on 1st November, 1964. As with other commodities, provision was made for a transition period during which certain national arrangements were to be abolished, those which remained were to be harmonized, and trade in beef and veal within the Community was to be liberalized. The latest indications are that a uniform market will be in operation from 1st April, 1968.

The regulatory measures for beef and veal should be judged in relation to some of the characteristics of the beef market. These characteristics include a growth in consumption; increased production, though at a slower rate than consumption; the probability of favourable producer prices, and a continuing need for imports into the Community. The measures taken were thus framed more liberally than was the case with pigs, for example.

The market for beef

According to figures published by the E.E.C. statistical office, total consumption of beef and veal increased by nearly 40 per cent between 1956 and 1963. During the same period, production rose at a slower rate—barely 30 per cent—and more beef has had to be imported to meet the additional demand.

COMBINED BEEF AND VEAL CONSUMPTION AND PRODUCTION IN THE E.E.C.

	Consumption	*Production*	*Level of self-sufficiency*
	(thousand metric tons)		%
1956	3,010	2,905	97
1958	3,285	3,032	92
1963	4,150	3,710	89
1970 (forecast)	5,021	4,707	94

In 1963 the proportion of total beef and veal consumption in the E.E.C. covered by domestic production stood at 89 per cent. With an increasing population and a growth in consumer income, consumption is expected to continue to rise and will exceed 5 million tons by 1970. It will then be 67 per cent above the 1956 level. Despite a further rise in domestic production, the Community is likely to continue to import beef in the future.

The regulations relating to the stage-by-stage establishment of a common organization of a beef and veal market provide for guide prices and customs duties as the principal means of support, with supplementary measures afforded by levies and domestic intervention prices, the latter marking the level at which the price supports of individual member states come into operation.

Guide prices

At present, each member state fixes its own guide prices within certain upper and lower limits laid down annually by the Commission. They are calculated separately for live cattle and calves, and are based on typical market prices in consumer and producer areas, also taking into account the situation in the market for milk and milk products. The upper and lower limits and guide prices for the year April, 1966, to March, 1967, are shown below.

E.E.C. Upper and Lower Limits

(per live cwt)

	s.	*d.*		*s.*	*d.*
Cattle	219	6	to	233	1
Calves	290	3	to	314	9

Guide Prices

(per live cwt)

	Cattle		*Calves*	
	s.	*d.*	*s.*	*d.*
Belgium	232	11	290	3
France	221	9	302	9
W. Germany	229	6	304	9
Italy	233	1	299	4
Luxembourg	228	7	308	5
Netherlands	222	6	290	3

There are two points worth emphasizing at this stage. Firstly, with the exception of Belgium, there is no seasonal scale of prices. Secondly, although the guide price is vitally important to the future price level in member states, it is in no sense a guaranteed price. It is merely a price which is considered desirable for producers to obtain under normal market conditions. The upper and lower limits are being progressively narrowed during the transition period, at the end of which, in April, 1968, there will be a uniform guide price for all member states. The common guide price which is to operate from that date will be 240*s.* 3*d.* per live cwt for adult cattle and 325*s.* for calves.

Customs duties

Customs duties, or tariffs, are the main instrument for ensuring that domestic producer returns do not depart too far from the guide prices.

The duties on trade within the Community are being gradually abolished, while those applicable to third countries are to be brought into line by April, 1968, when the common external tariff will be 16 per cent for live animals and 20 per cent for meat. Since market prices in individual member states are likely to be higher than the guide prices at certain times of the year, it is anticipated that the customs duties alone will often furnish adequate protection. Should they not be sufficient, however, and should domestic prices come under pressure, two further means of support may be used.

Supplementary levies and intervention prices

For trade in cattle and calves with countries outside the Community, import prices, or more accurately world market prices, are calculated weekly by the Commission. Average prices in Denmark, Great Britain and the Irish Republic, weighted 50, 30 and 20 per cent respectively, are used to determine the import price for cattle. For calves, the Commission employs quotations from one country only—Denmark. The levy when applied by an importing member state to supplies from third countries is equal to the difference between its guide price and the world import price plus customs duty plus a standard cost of transport. But the application of the levy is conditioned by the relation of the current average market prices to the guide prices for cattle and calves, and is determined by the following precise rules.

1. When the average domestic market price exceeds the guide price by 5 per cent or more, there is no levy and only the customs duty is applied.
2. When the domestic market price falls below the guide price, the levy is charged in full.
3. When the domestic market price is at any level between the two, that is, at between 100 and 105 per cent of the guide price, only half the levy is charged.

The position may be seen more clearly from an example relating to the Netherlands during the week beginning 27th June, 1966.

	s.	*d.*	
Guide price	222	6	per live cwt
Average market price	230	3	,, ,,
World import price (plus customs duty)	193	6	,, ,,

The full levy would have been 222*s.* 6*d.* *less* 193*s.* 6*d.*, i.e., 29 shillings. Since the average market price is less than 5 per cent above the guide price, half the levy is chargeable, i.e., 14*s.* 6*d.*

The possibility of intervening in the market by means of support buying by national agencies affords additional protection and stability to the markets of individual states. Intervention prices are fixed at between 93 and 96 per cent of the guide price and members are permitted to intervene at this level to prevent a substantial fall in the returns to domestic producers.

Basic provisions

Such, in essence, are the basic provisions of the common organization for beef and veal. There are, of course, many more details of a more complex nature, some of which are permanent and others temporary, arising from the need to safeguard the interests of individual members during the transi-

tion period. Of a more permanent nature are the co-efficients which are applied to the levies on live animals in order to determine the levies on cuts of beef and veal. Special provisions exist for member states being permitted to apply refunds on exports to third countries. These refunds are based on the difference in prices in the exporting country and on world markets. Frozen meat, which is in demand in some E.E.C. countries for processing, is subject to special arrangements including a quota at a certain rate of duty bound under the G.A.T.T., and for which additional quotas are fixed each year.

However, these and other points of detail should not be permitted to obscure the fact that, compared with pigs and pigmeat, the beef and veal regulations are clearly defined and easy to administer. There seems little doubt that the need for more and better quality beef in the years to come has resulted in the regulations being more flexible than they would have been if production had been anticipated to overrun demand.

Mr. Rickard's article 'Pig Production in the Common Market' appeared in our October issue.

The Ministry's Publications

Since the list published in the November, 1966, issue of *Agriculture* (p. 538), the following publications have been issued.

MAJOR PUBLICATIONS

Bulletin No. 9. Beekeeping (New) 3*s.* (by post 3*s.* 5*d.*)

Bulletin No. 38. Sex Linkage in Poultry Breeding (Revised) 8*s.* 6*d.* (by post 8*s.* 11*d.*)

ADVISORY LEAFLETS

(*Price* 4*d. each—by post* 7*d.*)

No. 37. Lackey Moth (Revised)
No. 224. Red Spider Mite on Glasshouse Crops (Revised)
No. 543. Black Currants (New)
No. 544. Rabbit Meat Production (New)

FREE ISSUES

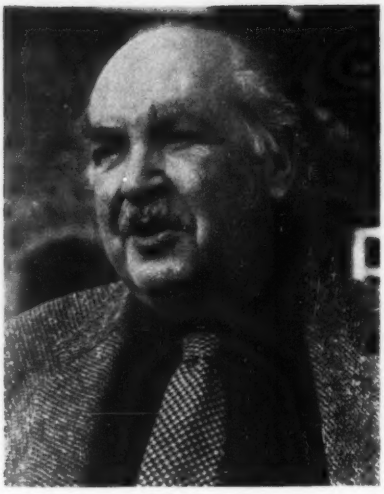
Guide to the Safety, Health and Welfare Act and Regulations (Revised)

STL No. 20. Chemical Weed Control in Flower Crops (Revised)

The priced publications listed above are obtainable from Government Bookshops (addresses on p. 606), or through any bookseller. Unpriced items are obtainable only from the Ministry (Publications), Tolcarne Drive, Pinner, Middlesex.

Sir Dudley Stamp

1898 — 1966



'Few men belonged so completely to the world at large . . . the hearts of his colleagues in every country went out to the man himself—gentle, unassuming, compassionate, humorous'.

IT WAS in these words that the Principal of King's College, London, described one of the College's most illustrious sons, the late Sir Laurence Dudley Stamp, C.B.E., Emeritus Professor of Geography of the University. They are words that will be gratefully echoed by all who knew him. Among those who work on and love the land, he had a host of friends—farmers, scientists and other experts in environmental studies. They joined with his colleagues on many Governmental and academic committees and authorities in acclaiming the knighthood which was conferred on Dudley Stamp in the New Year Honours, 1965, for his services to land use. But they were spokesmen for a much greater multitude of peasants and food producers from many developing countries who can, in time, expect their lives to become richer and easier because of the scholarship, experience and understanding which Stamp brought to the study of their problems. The World Land Use Survey and his many other international activities will stand as a monument to his work for mankind.

When he became a member of the Farm Survey Committee of the Ministry of Agriculture and Fisheries in 1940, Dudley Stamp was already a figure of international repute. He had crowded far more into his first forty years than most achieve in a lifetime. Despite indifferent health as a boy, he had graduated at King's College at the age of 19 and immediately joined up to become a young subaltern in the Royal Engineers. On demobilization, there followed expeditions to Upper Burma, where he penetrated into unexplored villages armed only with a vintage portable gramophone and a record of Sir Harry Lauder singing 'Will ye stop your tickling, Jock'. At twenty-five he was appointed to a chair at Rangoon University as Professor of Geology and Geography and thus became the youngest professor in the (then) British

Empire—he always remained the youngest in heart. By the 1930s, he had, whilst holding the Sir Ernest Cassels Readership in Economic Geography at the London School of Economics, already become a household name both among professional geographers and the younger generation who looked to Stamp's text-books to see them through the geography papers of the School Certificate. But by now he was also mounting—largely at his own expense—the great survey, mapping and assessment of the land of Britain, its qualities and utilization. The results of the Survey were published first on one-inch maps, then in the *Land of Britain: County Reports* and in 1936 in *Land of Britain: Its Use and Misuse*. It was on this Survey that so much of his subsequent work and of the work of land planners generally was to be securely based. In its essentials, the Survey has stood the test of time but it was always a matter of regret to Stamp that no authority, as distinct from individuals, assumed his great pioneering effort so as to keep it up to date.

In 1941, he was appointed Vice-Chairman of the Scott Committee on Land Utilisation in Rural Areas. He always looked back with pride to the part which he played in framing the Committee's report, one of the leading policy-making documents of the war years. In the following year he became the Chief Adviser on Rural Land Utilisation to the Ministry of Agriculture and swiftly gathered a band of dedicated experts (but not—and this was characteristic—simply academic experts) in rural land use. Together, they helped to forge an organization and policy for agricultural land conservation which served the country well in the difficult post-war years and which continues to be reflected in rural land planning at national and local levels to this day.

It is virtually impossible to estimate the extent of Stamp's success. Despite his powerful but down-to-earth imagination, he was no academic visionary. He saw that there were major developments, such as the siting of Heathrow Airport on top quality Thames Valley land, which were not to be denied. In subsequent years, as more and more pastures and fields have disappeared under bricks and mortar, some have hinted that agricultural land conservation is a waste of time. But the test lies in the unmeasured and immeasurable saving of good land due to potential developers being dissuaded from ever starting to fight. The result is to be seen around us in the well-ordered growth of towns and villages since 1945 as contrasted with the inter-war years' sprawl.

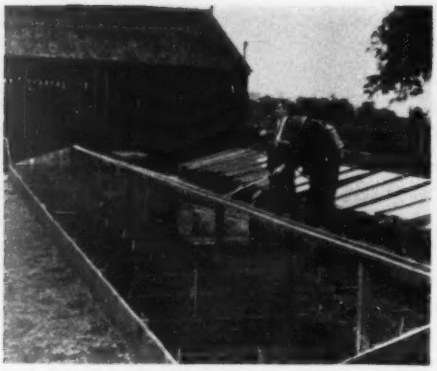
By 1955, the Agricultural Land Service was ready to take over the work of the Rural Land Utilisation Officers, thus freeing Dudley Stamp for the ever-increasing number of other calls on his time. There was his service as the U.K. Delegate to the Land and Water Sub-Commission (of FAO) of which body he was also regularly reappointed Vice-Chairman. There was also his membership of the Royal Commission on Common Land and later of the Nature Conservancy—both offshoots of the Scott Report.

It is impossible to say anything here about his many academic offices and honours or the distinction which he brought to other walks of life. He was always a good companion. Some may look for greater taciturnity and staidness in a professor, but those who knew him well knew also that he very seldom talked anything but good sense.

Poorer we all are for his death but few men in modern times can have so enriched others by their lives.

G. L. Wilde

Planned Cauliflower Production



Experiments on the control of downy mildew on cauliflowers at Kirton E.H.S.

John D. Whitwell

THE cauliflower is an attractive vegetable, rich in proteins, minerals and vitamin C. It has a low calorie value per lb and is easily digested. Consumption in the U.K. is valued at 1·17 pence per head of population per week, but there is every possibility that this figure will increase once high-quality cauliflowers are regularly available and presented as convenience foods in cellophane or waxed-paper wraps, either whole or cut into segments. Cauliflowers of the right size and grade, pre-packed in cellophane, are being sold in chain-store organizations at the present time, but this constitutes only a small proportion of total production, and buyers still experience difficulty in obtaining the quality required at certain times of the year.

The problem for the grower is how to maintain quality and continuity of supply throughout the year, in a notoriously changeable climate and with a crop which is itself extremely sensitive to climatic changes, particularly in temperature. This article is not intended to describe how these difficulties can be removed entirely, but to indicate how it is possible to phase crop production in the best possible way to avoid extreme gluts and shortages. Success will be assured when sensible growing methods are adopted to supply the known requirements of an efficient marketing organization.

Crop production

Cauliflowers may be divided into three main groups: (1) Winter Hardy, (2) Early Summer and (3) Late Summer and Autumn. Group (1) cauliflowers mature in the eastern counties between the last week in March and the first week in June, group (2) from the last week in May until mid-July, and group (3) from July to December. In January, February and early March, supplies come from Cornwall and, to a lesser extent, Devon, where it is possible to grow the Roscoff types which are not completely frost-hardy. The growing techniques and varieties used for each group differ and for convenience it is best to discuss each one separately and to note the phasing of production by the selection of early, mid-season and late varieties in each group.

Winter-hardy cauliflowers

The main areas of production of winter-hardy cauliflowers (often incorrectly termed broccoli) in England and Wales are the silt lands in Holland (Lincolnshire) and adjacent counties, the Isle of Thanet in Kent, and the West and East Ridings of Yorkshire. The seed is sown in outdoor seedbeds in late May, and the plants are machine-planted 2 ft 3 in. square when they are 7 to 8 weeks old. Cultural factors which are of prime importance in winter-hardy cauliflower production are: sowing the seed at the correct time; dressing the seed to prevent pre-emergence damping-off, and second-generation cabbage root-fly attack; sowing the seed thinly, not more than 1 oz of seed to 400 ft of drill; irrigating the seedbed if necessary; selecting a moderately fertile seedbed, not adjacent to other brassica crops. Compacted and dry headlands are unsuitable. The plants should be planted out when 6 to 8 weeks old, and not left to become drawn and checked in the seedbed. Aphids spread cauliflower mosaic virus, and plants with this disease fail to overwinter satisfactorily. The seedbed should be sprayed with an approved organophosphorus insecticide and this can be followed by an application of the same material in granular form after planting. Nitrogen top-dressings are necessary in late-February and mid-March.

Varieties and economics

Varieties, as shown in Table 1, may be chosen to provide heads from late-March to early-June from a single sowing and planting date.

Table 1

Early varieties (maturing mid-March to mid-April)	*Second Early varieties* (maturing late-March to early-May)	*Midseason varieties* (usually have a 50% cutting date in the first week of May)	
Early April	Princess	April Glory	Apriltide
Armado Early	April Queen	May Glory	Maytide
		Armado Late	Mayfare
		May Heading	May Surprise
		April May	

Late midseason varieties (maturing mid-May)	*Late varieties* (maturing late-May to early-June)
Late Self-Protecting	Progress
Markanta	Improved June Market
Midseason	Midsummer
May Monarch	Asmer Juno

The economics of the crop are satisfactory. A good variety, grown well, will produce between 400 and 500 crates an acre, valued at 9*s.* to 10*s.* each. The cost of production, including materials, labour, harvesting charges, rent and proportioned depreciation of farm equipment is calculated at 6*s.* 6*d.* a crate, leaving a margin somewhere between £50 and £80 an acre, dependent on managerial ability and weather conditions, to cover other fixed costs and leave a profit.

Early summer cauliflowers

Nearly half the total U.K. acreage of early summer cauliflowers (3,645 acres) is grown in Holland and Lindsey (Lincolnshire); the remaining

Controlled propagation

acreage is widespread throughout the country, with concentrations in Lancashire (1,142 acres) and, to a lesser extent, in Worcester (593 acres) and Gloucester (224 acres).

Growing systems are diverse and vary from one part of the country to another. Even on a single farm two different methods may be employed, one to provide early and the other to provide mid-season and late cauliflowers. In the eastern counties, early summer cauliflower seed is sown in the autumn during the last week of September and the first two weeks of October—the earliest varieties are sown at the latest date. The seed is drilled or broadcast in Dutch-light frames or cold glasshouses, and then pricked off into pots or soil-blocks for the early crop, or into Dutch-light frames for the main-cropping period. Plants pricked out into frames are known as drawn plants, and are much cheaper to produce than pot plants.

In Holland (Lincolnshire) 45 million early summer cauliflower plants are planted annually, and many of these are raised by specialist nurserymen who grow vast quantities of plants each season for sale to growers and farmers. Propagation costs are high and new techniques have been introduced recently to lower the cost of plant raising. Seeds are drilled directly into glasshouse borders or frames with such accuracy that they can stand throughout the winter without being pricked out. In some cases all that is required is a slight thinning after germination. In order to do this, it is necessary to know the numbers of seed per given weight and the germination percentage, and to have available a small precision seed drill. The seed drill is calibrated to sow exactly 12 viable seeds per 1 ft run in rows 3 in. apart. Specialist growers make their own precision seed drills, but one drill made by a Danish firm is cheap and effective if slight modifications are made to the coulters and trouble is taken to calibrate it accurately. For the best results a level friable seedbed is required with the correct moisture content.

Economics

Early summer cauliflowers overwinter from September to March in frames and glasshouses, and therefore plant-raising costs are high. Table 2 shows a breakdown of the main costs of plant raising.

Table 2

Comparison of plant-raising costs per acre

(15,000 plants raised to plant 1 acre 2 ft × 18 in.)

Method	Cost of materials	Labour hours Male 5*s.* 7*d.*	Labour hours Female 4*s.* 7*d.*	Tractor hours 4*s.*	Cost labour and tractor	Total plant-raising cost per acre
	£				£ s. d.	£ s. d.
3 in. peat pots	124	84	150	2½	58 6 6	182 6 6
3 in. whalehide pots	60	84	150	2½	58 6 6	118 6 6
Lettuce tubes	32	70	116	2	46 10 6	78 10 6
†Pricked-off (drawn plants)	18	98	110	1	52 15 4	70 15 4
†Direct drilled (no pricking-off)	14	100	4	1	29 0 8	43 0 8

†Frames steamed.

These raising costs compare pots and tubes in cold glasshouses pricked-off and drawn plants in frames. The labour hours and charges will vary according to the scale of the enterprise.

In the eastern region of the U.K. early summer cauliflowers mature in mid-June and follow the earlier West Midlands pot-grown crop, but even so 700 to 800 acres of pot-grown plants are raised annually for early-June maturity. At Kirton Experimental Horticulture Station, cheap methods of production are being investigated. This year's results indicate that the variety Romax Early can be grown very successfully by sowing on the 9th October and planting early- to mid-March. This variety was drilled directly into cold glasshouse borders and left unthinned until planted in the first two weeks of March. Cutting commenced on the 3rd June and 50 per cent were cut by the 13th June, the crop finishing on the 20th June. All were in the high price period.

Other low-cost methods were equally successful in producing early cauliflowers. The varieties Delta, White Spring, Cantab and Perfection (Da)*, sown on 12th and 15th October and pricked out into lettuce tubes (small bottomless whalehide sleeves costing less than a farthing each), were planted during the first two weeks of March. These varieties reached the 50 per cent cutting period by the 13th June at a plant-raising cost of £70 an acre, which is very nearly equivalent to the cost of pricked-out plants. Good quality early cauliflowers can be produced cheaply on the silt lands and in the future growers may phase production to cover the whole season from late-May to late-July.

In the 1966-67 season an experiment will be conducted at Kirton E.H.S. to determine the possibility of direct-drilling early summer cauliflowers into frames in late-September/early-October and leaving them entirely unventilated until a week before planting out. This will reduce the cost of plant raising considerably and there are already indications that this is a feasible method.

Propagation and varieties

Successful propagation requires an intimate knowledge of the different varieties and their respective needs. It is desirable to produce an undeveloped plant with a few large leaves and a good root system for planting in early-March, just as soon as soil conditions are suitable. Early summer cauliflowers are cut between the last week in May and late-July. The varieties in Table 3 provide continuity through this period, from late-September and early-October sowings.

*Dachnfeldts—to distinguish from other varieties named 'Perfection'.

Table 3

Extra early	*Early*	*Midseason*	*Late midseason*
Romax Early	Perfection (Da)	Delta	Garant
	Cantab	White Spring	Alpha
		Vedeslez C.	Dania
			Snowball 113

Late	*Extra late*
Idol	Dominant
Grandessa	Midsummer No. 2
Danish Giant No. 7	Dr. Jensma No. 5
Selandia	Sesam
Cambridge mid-early	

Summer cauliflower production

Producing good quality cauliflowers in late-July and August is difficult because they have to mature in the warmest months of the year and also because the cauliflower must be planted during May when the land has a low moisture content, and ground frosts occur frequently. The Le Cerf types of seed stock are the most suitable for this time of the year and despite their shortcomings are still the most profitable ones to grow, year in and year out. At Kirton E.H.S. other varieties are being tried in comparison with Le Cerf for July/August maturity, but in the past two seasons only Flora Blanca has given results equal to that of Le Cerf, although the Danish varieties Prim and Strong and the two Belgian varieties selected by Dr. Jensma, Dr. Jensma No. 5 and Dr. Jensma No. 6 Sesam, have proved very promising.

Planting quick-maturing varieties in dry soil during May can be a disastrous practice leading to heavy losses through buttoning and low yields because of small head size. Growers and experimental workers in Holland state that the problem of buttoning can be overcome by direct-drilling cauliflowers in April. Alpha selections and Danish varieties such as Dominant are sown in rows 2 ft apart and finally chopped out to 18 in. in the row. This season the summer cauliflower variety trial at the National Institute of Agricultural Botany's trial centre at Cambridge was direct-drilled and many of the early-maturing varieties, which produce small precocious heads when transplanted, did very well indeed.

More recently Betzema J. and Snoek N. J., reporting on work carried out at the Experimental Station for crops grown in the open ground at Alkmaar, North Holland, stated that January sowings of Le Cerf gave a better yield than those from autumn sowings and matured approximately 12 days later. In addition, the condition known as blindness, which is very common in autumn-sown crops, is reduced to nil by sowing in January. The period in late-July can be adequately covered by sowing late-maturing Le Cerf selections such as Le Cerf Improved, Le Cerf B and Le Cerf Autumn in the second half of January and planting out in April.

Table 4 shows the varieties which have given good yields and quality during the mid-July to late-August maturity period at Kirton E.H.S. The seed is drilled directly into frames to give a stand of approximately 400 plants per Dutch light and the frame soil is covered with a $\frac{1}{4}$ in. layer of moistened peat immediately after sowing. For preference the plants should be 6 to 8 weeks old when planted.

Table 4

Group	*Variety*	*Sowing date*	*Planting date*	*Approximate 50% maturity date*
	Late Le Cerf types			
1	Le Cerf Improved Le Cerf B	Second half January	Late-March/ early-April	Mid-to-late July
2	Prim Strong Sesam Le Cerf Improved	Early-February	Late-April/ early-May	Late-July/ early-August
3	Prim Flora Blanca Le Cerf Improved Le Cerf A Le Cerf Autumn	3rd week March	Mid-May	Mid-to-late August

Varieties such as South Pacific and Flora Blanca, sown during April and planted in late-May and early-June, will continue the supply into early-September.

Autumn cauliflowers

Approximately 50 per cent of the total acreage of autumn cauliflowers produced in the U.K. is grown in Holland (Lincolnshire). The main autumn crop for September-to-December maturity is sown in outdoor seedbeds but better plants are produced if the seed is sown in Dutch-light frames in mid-May (vacant after early summer cauliflower) and transplanted 6 to 7 weeks later at a distance of 27 in. × 27 in. This crop normally follows early potatoes, or an early crop of peas, but is frequently planted on fallowed land, or after a short-term ley. For maximum yields moisture-retentive soils are essential, and it is not good practice to follow a previous spring cabbage or broccoli crop.

Production costs for autumn cauliflower are relatively low. For a 700 crates an acre crop, costs of production are approximately £20 an acre for materials, £13 for growing and £29 for harvesting, a total of £62 an acre. Suitable varieties are shown in Table 5.

Table 5

August heading	*September/October heading*	*November/December heading*
Dr. Jensma No. 6 Sesam	Atle	Canberra
Avans	Le Cerf (late cultivars)	Late Supreme
Le Cerf (early cultivars)	Silver Fox } synonymous	
Late Mechelner*	South Pacific }	
	Austral } synonymous	
	Jack o'Lantern }	
	Kangaroo	
	Flora Blanca	

*One year's trial only.

Trends and developments

Considerable advances have been made in machinery used for cauliflower production. Fertilizer and granular insecticide applicators are now available capable of sowing at a rate as low as 10 lb an acre to within plus or minus ½ lb. This means that insecticide application and cultivation can be carried

Modern machinery in cauliflowers. Horstine Farmery granule applicator

out at the same time, thereby lessening the number of operations and reducing the compacting effect of tractor movement through the crop. One or two planting machines have attachments that take pots, soil blocks and whalehide tubes, and one at least is fitted with equipment that can inject fluid around the base of the plants as they are planted, an excellent method of applying sodium molybdate and cabbage root-fly control insecticides. Commercial processors are looking at machine harvesting, and one prototype harvesting machine being developed at the National Institute of Agricultural Engineering had a trial run on harvesting cauliflowers at Kirton E.H.S. in the autumn of 1965. Varieties such as South Pacific, which are very uniform and have strong leaves and a fairly short harvesting period, are the most suitable for mechanical harvesting.

Several new herbicides are now available for use on cauliflowers and are being tried out at Kirton, Luddington and Stockbridge House Experimental Horticulture Stations this season; they include CP31393 (Ramrod), Trifluralin, nitrofen, nitrofen and CIPC, Desmetryne and Simazine. Precision drilling of cauliflowers has not developed in the eastern counties but if herbicides are found that are safe and effective, more interest may be taken in this cheaper method of production.

Phasing production

Research workers have found that the growth of the cauliflower plant and its principal organs is more closely related to accumulated temperature than to any other climatic factor. This information leads to a new approach to the forecasting of time of curd maturity which is being investigated at several centres in England in a cauliflower maturity experiment sponsored by the National Vegetable Research Station; Kirton E.H.S. is one of these centres.

Summer and autumn cauliflower varieties are sown at intervals (from late-March to early-June) calculated not on a calendar date basis but on a temperature/time basis, estimated from a given number of accumulated day degrees above 32 degrees F. The selected varieties are sown on the first date, and as soon as the correct number of day degrees has been counted, the second sowing is made, either of the same varieties or those of a different

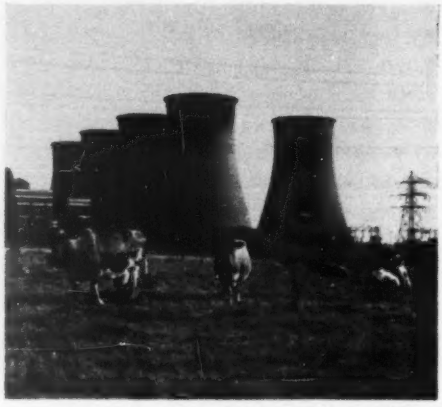
group. The period between sowing dates is thus related to temperature, and it has already been stated that temperature determines the rate of development of the cauliflower. A definite stage of development is, therefore, reached by the population of plants from each sowing date before the next batch is sown. Over a period of years it should be possible to determine the average time necessary for a variety to reach curd initiation after planting and the average time taken from curd initiation to curd maturity. Growers who wish to programme cauliflower production will decide on a date when the heads are to be harvested and then work back to calculate the correct sowing date for the variety chosen. Work along these lines is progressing favourably at the N.V.R.S. but there are complications and these require further investigation before this method of forecasting harvesting dates can be recommended with certainty. This is a definite step in the right direction because it will even out the supplies of cauliflowers throughout the season, and reduce the errors which lead to heavy supplies followed by gaps in production. Cauliflowers can also be cold-stored in bulk for a period of 2 to 3 weeks, in which case reserve supplies can be kept in hand during times when production is higher than required on the market.

Improved methods of calculating maturity dates and the advent of cold storage will help growers to programme their cauliflower production more accurately and this will assist in supplying new markets such as chain-stores and self-service shops whose requirement is for quality graded produce in regular supply.

Regulations prescribing National statutory grades for cauliflowers sold through wholesale channels are to be introduced under the Agriculture and Horticulture Act 1964. Details of the statutory grades, notes on their application, and details of the labelling regulations are published in *Guide to the Grades No. 5—Cauliflowers*. Copies may be obtained, free of charge, from Regional and Divisional Offices of the Ministry or from M.A.F.F. (Publications), Tolcarne Drive, Pinner, Middlesex.

This article has been contributed by **John D. Whitwell, Dip.Hort., N.D.H.,** who is in charge of the vegetable and fruit experiments at the Ministry's Kirton Experimental Horticulture Station in Lincolnshire. After six years in horticultural practice, Mr. Whitwell became an assistant lecturer at the Yorkshire Institute of Agriculture (W.R.) before joining the N.A.A.S. in 1958. He visited Holland in June of this year to study the production of cauliflowers and onions.

47. Atherstone, Warwickshire



Dairy herd strip-grazing in the shadow of Hams Hall power station

P. R. Marshall

TO ANYONE not acquainted with the county the words 'Atherstone district' immediately conjure up a picture of coalfields and industry. To a large extent this is true, but when you get to know it, there is also a lot of first-class farming going on. The district comprises approximately 68,000 acres in north-west Warwickshire. It includes the city of Birmingham and the southern boundary is approximately that of the A.45—the Birmingham end of the M.1. The district runs eastward from Birmingham through Meriden—the centre of England—almost to the edge of Coventry. At Meriden the boundary turns northwards through Fillongley and Ansley along the edge of Nuneaton to the Watling Street at Mancetter. It then follows the Leicestershire border up to No Mans Heath and the western boundary is the Staffordshire border down to Sutton Coldfield and Birmingham.

The geology is very varied and industrially this has proved of great value. In addition to the long-established and well-known north-Warwickshire coalfields around Atherstone, there is, and has been for over 20 years, a tremendous lot of coal obtained annually by opencast methods. As well as coal, there are extensive deposits of clay around Kingsbury and Wilnecote which are mined for both glazed tiles and brick making. Near Mancetter, extensive granite quarries are constantly in production. Finally, to the north of Coleshill and Lea Marston vast areas are worked for sand and gravel. There are also a lot of factories on the edge of Birmingham and three very large generating stations at Hams Hall near Coleshill; these, and the recently-erected gas plant, provide a landmark of towers and chimneys which can be seen for miles.

Like the geology, the farming is very mixed. There is every branch of arable farming from continuous corn to ley farming with a variety of crops, and there is every sort of livestock except hill cattle and hill sheep. The soil types are also very variable, ranging from light gravel land around Sutton

Coldfield to some fairly heavy clay. The majority is on Coal Measures and consists mainly of marls and sandstones, with some drift. Most of it is a deep medium loam and is very fertile provided the drainage has been attended to. On the eastern edge of the district there is a belt of old red sandstone with some marl which is very productive for corn, potatoes and grass.

Of the 68,000 acres, approximately 30,000 are in arable crops. Of these cereals predominate, with just under 10,000 acres of wheat and 14,000 acres of barley. Between 2,500 and 3,000 acres of potatoes are grown, over 95 per cent of them maincrop. There are several large growers who have pioneered modern techniques, especially indoor storage and pallet handling, including storing in boxes. Most of the potatoes are stored indoors and a clamp is something of a rarity.

Turning to livestock, the dairy cow predominates, although several farms are going in for beef. There has been a tremendous increase in the efficiency of dairying over the last few years, particularly with regard to increase in stocking rates. Invariably this follows the changeover from cowshed to loose housing and yard-and-parlour. Herds of 80 cows and more are getting quite common and there are several of 100–120 cows. It is also interesting to note that there is still a strong nucleus of dairy Shorthorn herds around Maxstoke and Fillongley.

Farming in such an industrial area is never easy and there is a great deal of competition all the time for both labour and land. However, it has some compensations, and this is very well illustrated by the growth in recent years of direct selling at the farm gate. The main products concerned are eggs and potatoes. In addition, several farmers have developed delivery rounds, taking these commodities into Coventry or Birmingham. A lot of the smaller dairy farms grow anything from one to four acres of potatoes and, with door sales, gross £200–£300 per acre from this crop.

Although skilled labourers, especially stockmen, are very scarce and command high wages, many farmers are able to employ industrial workers on a part-time basis. Several small farmers with 100 acres or less and a dairy herd, are able to get all their ploughing and cultivations done by, for example, a miner or industrial worker during his off-duty periods.

Special problems arise through the proximity of industry. One common one is trespass. Another which keeps occurring is heavy metal toxicity affecting crops in the Tame Valley. This appears to have been caused either by continual flooding or by the use of sewage sludge from Birmingham during and immediately after the last war. At that period there was a lot of market gardening in the Tame Valley region and vast quantities of sewage sludge were used as organic fertilizer. The amount of market gardening has dropped considerably during the last decade but there are still a few specialist growers, especially of outdoor lettuce.

In spite of the competition from industry for land, there are a number of large estates left in the area and it is very gratifying that these estates are carrying out as much farm amalgamation as possible to achieve bigger units. They are also very forward-looking in the provision of fixed equipment.

Although there are man-made chimneys, coal pits, power stations and heavy traffic, the district is not without charm, for it is gently undulating and rises to 800 ft at Baxterley. The area is very well served with both main and minor roads and it is amazing how quickly one can get from industry and heavy traffic into quite rural parts.

A Welsh Farmhouse

D. M. James
Agricultural Land Service, Carmarthen

ON THE western slopes of the Cambrian mountains of mid-Wales, three miles east of the village of Pontrhydfendigaid, Cardiganshire, is Tynddol Farm, the home of Mr. and Mrs. W. D. Owen. The neighbouring countryside is outstandingly beautiful and completely unspoilt. Nearby are the Teify pools, the source of the famous salmon river of that name. In 1958 the waters were impounded by the Cardiganshire Water Board and now provide water for the whole of mid- and south-Cardiganshire. Near the eastern boundary of the sheepwalks on the borders of Cardiganshire, Breconshire and Radnorshire, is the Claerwen reservoir, one of the sources of supply of water to the city of Birmingham.

Altogether Mr. Owen farms 2,810 acres, part of which is owned and part rented. There are 30 acres of in-bye land around the homestead, and the mountain sheepwalk adjoining is 830 acres. He also owns 90 acres of land four miles to the west, which is used mainly for the wintering of ewe lambs, and rents a mountain sheepwalk of 1,860 acres from Birmingham Corporation. The sheepwalks run to a height of 1,900 ft. The climate in winter is very severe, with an annual rainfall of 70 inches. The homestead lies at an elevation of 1,100 ft, in a small, sheltered hollow in the hills. The farm is a substantial viable unit, with a strong economy based on a flock of 2,500 Welsh mountain ewes, together with 30 head of horned stock.

In the last century the old farmhouse was occupied by a shepherd, before the farm was let to the present owner's grandfather. It was a typical stone and slate structure. But the roof was poor, the walls were damp, and the layout of small narrow rooms and stone slab floors was inconvenient. At first, Mr. Owen intended to improve and modernize the house but, after obtaining professional advice, it was found that the cost involved would be too high and that, even then, it would still be inconvenient and expensive to maintain. Consequently his thoughts turned to building a new house, but there were two problems to be solved before a final decision could be taken. The homestead was on steeply sloping ground with rock outcrops, and the land available was limited and very exposed to wind and driving rain from all directions. Mr. Owen therefore decided to use the sheltered site of the old farmhouse, taking advantage of the growing trees in front of it for further shelter from the south-west winds. The decision to demolish the existing house meant that his family had to move out while the new one was being built, so a wooden army hut 36 × 21 ft was bought and used as temporary living quarters. This

The new farmhouse in its sheltered site. In the foreground is the hut now used as a lamb wintering shed

was subsequently converted into a lamb wintering shed with a slatted floor, for in-wintering 100 ewe lambs.

It was essential for the new house to be ready by mid-July, for the annual shearing. This is done with the help of neighbours, and during shearing time there are as many as 120 people, including women helpers, at the farm for two days, all of whom must be provided with meals. The work therefore had to be fitted in between one shearing and the next. The plan and specification were drawn up and tenders invited. The lowest tender submitted was £5,650 and this was accepted. The superficial floor area of the house was 1,850 sq. ft and the price included the demolition of the old house and the excavation of rock to provide adequate space for the larger new house. Part of the old walling material was used as hardcore filling. A condition written into the contract was that work should begin in August and be completed by 31st December of the same year; nevertheless it was not finished until the following May.

The new farmhouse is built of traditional materials and design. It has 11 in. brick cavity walls, with a roof of Welsh blue slate, nailed to battens over felt. The ground floor is constructed of a 2 in. screed over bituminous reinforced felting, over 4 in. concrete. It has a wooden block floor in the hall and parlour, with quarry tiles in the remaining rooms. The first floor has five bedrooms, a bathroom and lavatory. On the ground floor there is a parlour, living room, larder, washroom and a large kitchen, measuring 21 × 11 ft, with a solid fuel cooker. The covered fuel store is outside. Water is obtained from a nearby spring collected into a 500-gallon storage tank, with a gravity flow through $\frac{3}{4}$ in. polythene pipes to the house and buildings. Electricity is generated by a turbine using water as the source of power. This is sufficient to supply all the needs of the farm, including power for electric fires, a washing machine and television set. Drainage is to a septic tank.

One vital question had to be answered before work started. Would the investment sufficiently increase the annual and capital value of the farm to make the expenditure worth while? After deducting a 50 per cent grant available as part of a comprehensive scheme under the Hill Farming and Livestock Rearing Acts, and taking account of the investment and capital expenditure allowances available, together with the likely saving in future repairs and maintenance, Mr. and Mrs. Owen have had no doubt that the money was well spent.

Books

Reclaiming Derelict Land. J. R. OXENHAM. Faber and Faber, 1966. 42*s*.

Doubtless the average person would approach the subject of land restoration from the standpoint in which he is especially interested. It is, therefore, particularly fortunate that the most authorative treatise yet produced on this subject should come from the pen of Col. John Oxenham who, from his wide experience, handles it in the broadest possible way. Dereliction is described as land which is uncared for or which has been damaged by some use or process and then neglected by its owner. The author even applies the term to low-producing agricultural land such as poor quality moorland, marginal land or relatively inaccessible hill country. In the succeeding paragraph he widens this definition by stating that the commonest conception of such land is such that it offends the eye. In the following chapters Col. Oxenham deals with the subject of reclamation from many other angles, and proceeds to a dissertation on the various Acts of Parliament and enabling means designed to assist local authorities in tackling the problems of restoration. A comprehensive description of the industries leading to dereliction follows. Some of these, like quarrying, are extractive and leave holes, while others lead to the accumulations of materials which may be used to redress the blemishes brought about by the former activities.

The author goes on to describe how each type of dereliction can receive remedial treatment. He deals broadly with the mechanical equipment side of the story and then discusses soil treatment, pioneer vegetation and tree planting. It is in its breadth of treatment of the various aspects of the subject that the book will appeal to the various interests such as local authorities, agriculturists, mineral operators, as well as those concerned with the production of filling material such as power station ash.

An earlier chapter indicates the extent to which extractive and other industries contributed to the total dereliction. This is particularly important in reaching an understanding of the question of priorities. For example, it states that the areas affected by sand and gravel extraction amount to 3,000 acres each year; the acres affected by extraction of chalk, limestone and igneous rocks 800 acres; ironstone 450 acres, and opencast coal 7,000 acres. After restoration the total annual net loss is about 3,500 acres.

The book refers to land as being one of the nation's most important assets, and, as there is not enough to satisfy the demands made upon it, land should no longer be wasted. Neither can the nation afford to be prodigal in its use. Agriculture, notwithstanding the greatly enhanced standard of productivity attained, is continually seeking more space for food production, to support an ever-increasing population. Not only can no waste of land be tolerated, but every effort must be made to bring back all existing derelict acres into beneficial use.

Reclamation techniques are dealt with in a very comprehensive manner and much emphasis is laid on the value of care in restoring the surface appropriate to the use to be made of it. Landscaping and forestry even come into the picture and are dealt with as essential parts of reclamation processes. A comprehensive bibliography is included, so that the reader can consult original papers and publications and, if he wishes, can probe more deeply into the subject. The book is eminently readable, and the author is to be congratulated on the way he has handled his subject in words and phrases so readily understandable.

W.M.D.

Tomorrow's Countryside—The Road to the Seventies. GARTH CHRISTIAN. John Murray, 1966. 35*s*.

'This book deals with the pressures on the countryside resulting from the increasing size and prosperity of the population and the increasing exploitation of science and technology in agriculture, industry and transport'. So says H.R.H. The Duke of Edinburgh in a foreword to this well-produced and attractively illustrated publication.

To the countryman, the assault seems to be led by development of various kinds including mineral workings and by the flood of townsfolk coming into the country for their recreation. Indeed, they come to particular beauty spots in such numbers as to destroy the peace and quiet they seek. But the sheer weight of numbers of people

alone is not the only menace. The car, the motor coach, caravans and camping, sailing and water sports, including fishing—all are gaining in popularity and demanding increased facilities. And this at a time when agricultural land is diminishing in area due to development and rivers, streams and sailing areas are scarce.

Positive awareness of the need for countryside conservation is the author's theme, and it should be emphasized that conservation is his watchword, not merely preservation without progress. Increased facilities for sports and pastimes, as well as for walking and the less energetic forms of recreation, need to be sensibly provided by intelligent planning and their use accepted by a public who must realize that there cannot be unlimited and unrestrained access to a countryside in which British farmers earn their living and produce nearly two-thirds of all the nation's food. We are only at the beginning of the road, and much needs to be done to get the town dweller and the countryman to live harmoniously together in an age when the internal combustion engine has annihilated distance and there is no longer the old difference between town and country. It is so easy to get anywhere these days.

The author attended, and often refers to, the conference 'Countryside in 1970'. He is committed to the idea of conserving the countryside, a theme which often arouses in people an emotionalism not altogether absent from the book. However, its comprehensiveness in treating every aspect of spoliation, and the arguments and facts which are set forth, make it a valuable book for those who, in various walks of public life, want to add their support. With such a noble theme, some enthusiasm and partisanship can readily be forgiven. Garth Christian, whose delightful articles in *Country Life* are particularly enjoyable, can be praised for his achievement in putting such a full account together in book form.

R.G.A.L.

Principles of Crop Husbandry 1. F. A. W. PEREGRINE, R. P. WESTON and G. J. ENGLAND. Hutchinson, 1966. 15*s*.

The following quotation from the introduction to *Principles of Crop Husbandry* makes perfectly clear what the book is about and for whom it was written:

> 'This book does not set out to describe the various methods of growing crops, but to deal with the many factors that affect crop husbandry. It covers City and Guilds Subject 265, and is primarily intended for students of agriculture, part time or full time; . . .'

The authors, all experienced teachers in farm institutes, have obviously found that some of their students have difficulty in making the most of their courses in crop husbandry because of deficiencies in their basic knowledge and have set out to provide a background text.

The chapters cover the elements of plant morphology and anatomy, plant physiology and nutrition, a brief introduction to soils, drainage and irrigation, liming, manuring and fertilizing, cultivations, weed control and, finally, pests and diseases and their control. A summary, in note form, follows each chapter as an aid to revision. The style is straightforward and very readable, the line drawings are clear and informative, and the whole book gives the impression that it has been carefully designed to fulfil a specific need with clearly limited objectives.

In trying to reconcile simplicity of presentation and brevity with the need for accuracy and balance, the authors had a difficult task. It is fair to say that, on the whole, this challenge has been successfully met but certain sections have given more difficulty than others. The chapter headed 'Drainage and Irrigation' has a mere paragraph on irrigation and this might have been better omitted altogether. A few technical errors have escaped the proof reader—quicklime is referred to as calcium dioxide and C is stated to be the chemical symbol by which calcium is known. A more regrettable lapse, particularly in view of the present sensitivity of public opinion concerning the use of toxic chemicals, is the statement in connection with pesticides that 'The crop should therefore be treated with an application of chemical *wherever possible* and particularly if there is likelihood of attack'. (Reviewer's italics.)

It must, of course, be remembered that this book will, in many instances, act as the basis for a course and that the teachers will expand upon the various sections, qualifying and amplifying those concepts which have, of necessity, been rather cursorily dealt with. For the unguided reader, it will provide a very useful introduction to a wide biological field and should find a secure place in the literature of agricultural education.

R.S.E.

Anatomy and Physiology of Farm Animals. R. D. FRANDSON. Baillière, Tindall and Cassell, 1965. £5.

The author of this book is Professor in the Department of Anatomy of the College

of Veterinary Medicine in Colorado State University. For a number of years he has taught undergraduate students who are majoring in animal husbandry, dairy production or agriculture. He has, therefore, purposely slanted this book in the direction which he hopes will be of most value to them.

The layout of the book in general is for a chapter of anatomy on a defined part of the body, to be followed by a chapter on its physiology, with excursions into allied subjects such as cytology, histology and biochemistry. The volume has obviously been developed from lectures and therein lies both its strength and its weakness. It is succinct and extensively illustrated with excellent diagrams, and the points which are of particular interest to agriculturists are sufficiently emphasized. For ease of understanding it does, however, require a fairly wide knowledge of basic scientific terms, despite the author's statement that most technical terms not found in an ordinary college dictionary are defined within the text. In fact, the book would be greatly improved by the provision of a glossary.

Technically it is excellent; the type is well set out and actual reading is easy, but it is difficult to decide the precise classes of reader in this country for whom the book would be necessary. It would be a valuable addition for libraries of higher education in agricultural and allied subjects, and to students of these subjects it would provide the fundamental points of the anatomy and physiology of farm animals with the horse and cow as the type subjects. The sheep, pig and dog are also described where there are important differences from the other two. There is also a most valuable appendix which, in tabular form, compares various organs as to their shape, size and so forth of the horse, cow, sheep, pig, dog and cat.

The book will also provide, in a readily accessible form, reasonably up-to-date information on physiology for the veterinarian, but its anatomy is not detailed enough for anybody who has had the opportunity of dissecting any one of the type species.

J.W.R.P.

The Production and Marketing of Pigs (3rd Edition). H. R. DAVIDSON. Longmans Green, 1966. 70*s*.

Students of agriculture at all levels, and many pig farmers, will need no introduction to this book for the 1st edition (1948) and 2nd edition (1953) have been widely used and valued for reference. Some indication of the need for a revised edition may be judged from the fact that one particular library copy of the second edition, while almost continuously on loan for several years after its publication, has not been borrowed more than three times in the past four years. The 3rd edition, prepared with the assistance of W. E. Coey, is therefore welcomed.

Parts I and II, dealing with general and economic considerations and technical aspects of pig production, have been substantially revised and some of the chapters on nutrition have been completely rewritten. The claim made on the dust cover that this work now provides a comprehensive examination of the many factors—economic, scientific and practical—in pig keeping, from conception to the final curing and processing of the carcass, is no exaggeration.

Unfortunately the book ranges wider than the title suggests, and this tends to make it a mixture of a very fine account of pig production with interesting but often irrelevant snippets about animal production in general. In some cases the ancillary information is too elementary for most students and producers; yet in others it is too complex. For example, the terms hog, boar and sow are defined while the reader is left to seek elsewhere, if needs be, for the definition of such terms as homozygous. There are interesting speculative accounts of the origins of terms, curing processes, carcass judging and breeds, but it is difficult to imagine the relevance to the title of the book of the history of vitamin discoveries or the story of Mendel's and Pasteur's work. It is impossible to imagine why plant breeders' methods are discussed here, and Hammond's work on Shire horse and Shetland pony crosses seems out of place as far as pig production in 1966 is concerned.

Possibly too much space is devoted to the feeding of mangels, acorns, beech mast and horse chestnuts, and some of the recollections are out of place. More details of the activities of PIDA could have been given. The work of 'A body required to interest itself in improving efficiency in the production, marketing and distribution of pigs . . . and improving the quality of pigs' deserves more than the half page it gets. A list of references extends to twelve pages but only a handful of papers published since 1962 are listed. Nevertheless, the library copy of this third edition will, I am sure, be borrowed very often during the next few years.

J.D.I.

Vacuum Silage in the South-West. V. H. Beynon and Carol A. Godsall. University of Exeter, 1966. 5*s*.

There can be no doubt that the tremendous interest which has flared up during the past two seasons in the technique of vacuum silage-making is absolute proof that many farmers, as well as advisers, are looking for a less risky form of grass conservation than by traditional methods. Intensification of grass production over the past few years by increased fertilizer usage, etc., has usually meant extra stock, thus accentuating this fodder situation.

This report of a searching survey on vacuum silage is, therefore, most timely and a refreshing approach compared with the usual economists' pre-occupation with the £ *s*. *d*. of a particular form of production. The survey was obviously well planned as an evaluation exercise to reveal the factors motivating farmers into a new technique and how vacuum silage is likely to fit in as a fodder conservation system on farms. At the same time, plenty of facts and figures are presented on the actual costs of making vacuum silage, item by item, in a sequence which is easy to follow and which builds up into a logical account of the whole process involved.

The experiences and reactions of the co-operating farmers are very interesting but not entirely valid in the absence of absolute comparisons. However, farmers' concern about reducing waste, producing a better-quality product and saving concentrates is emphasized and the report is worth reading by anyone interested in improving grassland utilization.

R.B.

The Charolais Report. Milk Marketing Board, 1966. 7*s*. 6*d*.

The importance of thoroughly testing the value of the Charolais breed in comparison with established British beef herds was acknowledged when the Charolais Group, set up by the Agricultural Improvement Council, decided that three types of trials were necessary. The first was concerned with the individual feed conversions carried out on research farms, and the second with controlled group feeding at forty-five experimental centres: both these trials were under the control of the Ministry of Agriculture.

The third trial was organized by the Milk Marketing Board and was planned to evaluate Charolais crosses under commercial farm conditions. This extremely well-produced report, which will be carefully studied by farmers, breeders and the meat industry, sets out the results of this investigation. It covers calving experience of cows in calf to Charolais bulls, growth rates of the cross-bred progeny, feed conversions and carcass quality.

There can be no doubt that the Charolais importations, not unattended by misgivings in some sectors of the farming world, have succeeded in stimulating a great deal of interest in this new potential in British beef production. Confidence is seen in the report's figures that, following the results from some of the controlled trials, the demand for Charolais semen from MMB centres has (at March this year) reached 11·6 per cent of all beef. Current demands are running at 2,000–3,000 a month more than last year, and the total number of services during 1966-67 may be as high as 90,000. The greatest users are the northern and south-eastern farmers.

The faster growth of Charolais cross-bred calves out of British dairy breeds, the better feed conversion, the slightly-higher killing-out percentage and considerably more lean meat are attractive factors. On the other hand, slightly more difficult calvings may be expected since the calves will be larger and carried for a longer term, and mortality among the progeny is likely to be slightly higher at, or just after, birth; but this, says the report, will vary with the management practised, the area of the country and the particular sire used.

S.R.O'H.

Books Received

Forestry Commission Report on Forest Research for the Year ended March, 1965. H.M.S.O., 1966. 20*s*. (by post 21*s*.).

Regulations for the Electrical Equipment of Buildings. Fourteenth Edition, 1966. Copies from The Institution of Electrical Engineers, Savoy Place, London, W.C.2. 17*s*. 6*d*. (including postage).

The Small Fen Farm. C. M. Williams and J. B. Hardaker. Occasional Papers No. 10. Farm Economics Branch, School of Agriculture, Cambridge. 3*s*. (including postage).

Towards Better Marketing. Report and Proceedings of the Third Annual Residential Course of Studies at Nottinghamshire Farm Institute, Brackenhurst, Southwell, Notts. 5*s*.

AGRICULTURAL CHEMICALS APPROVAL SCHEME

Since the publication of the 1966 List, the following products have been approved:

INSECTICIDES

PHOSPHAMIDON

For use on sugar beet, beans and potatoes—Ciba

Liquid Formulations

Dimecron

HERBICIDES

2, 4-DB with MCPA

Potassium and Sodium Salt Formulations

Kilbut Plus—Agricola

LAWN SAND

Based on sulphate of ammonia and iron sulphate for control of moss and many broad-leaved weeds, particularly plantain and daisy, in established lawns.

Fisons Lawn Sand—Fisons Horticulture

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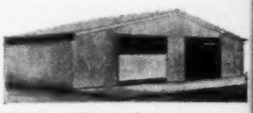

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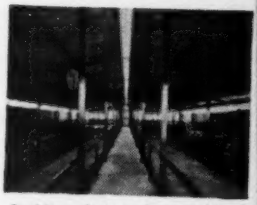

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